Gas Journal

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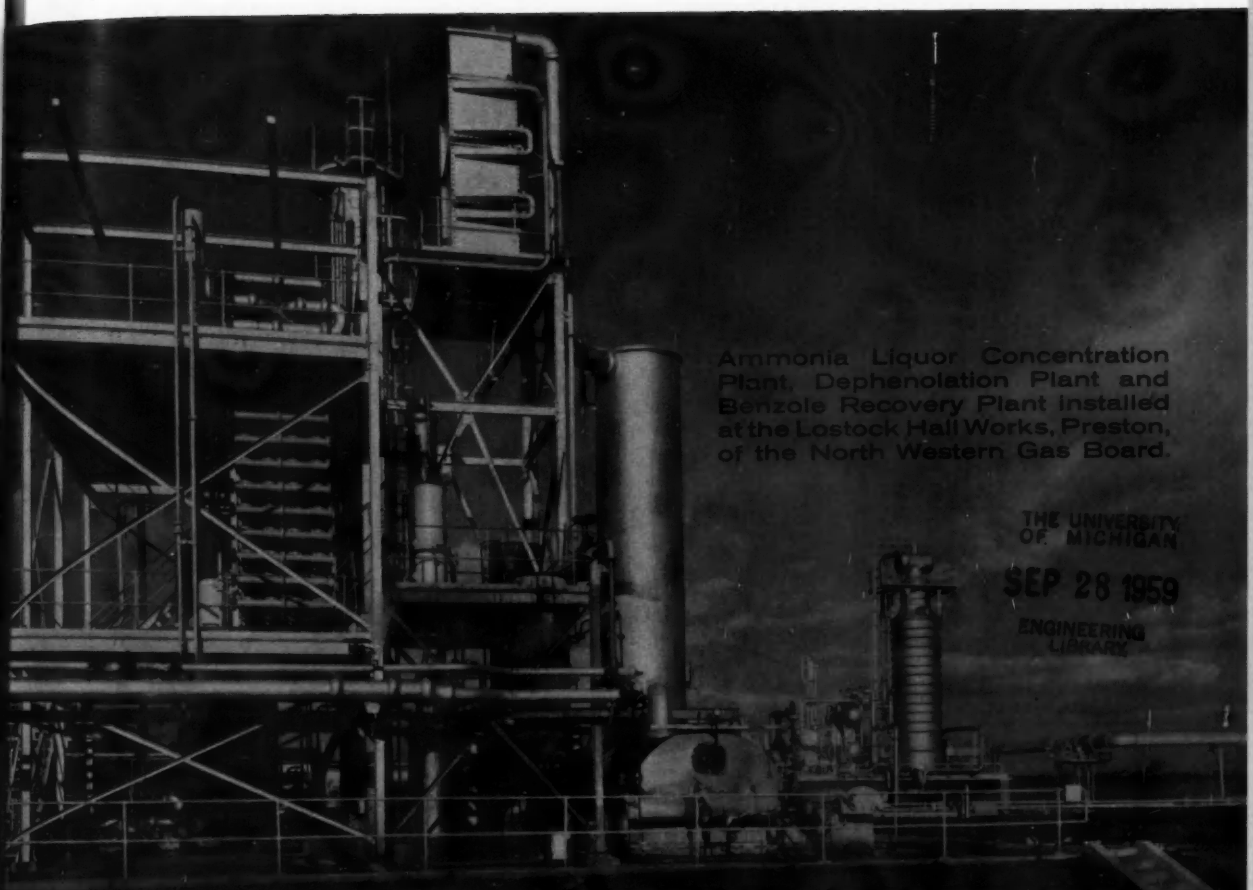

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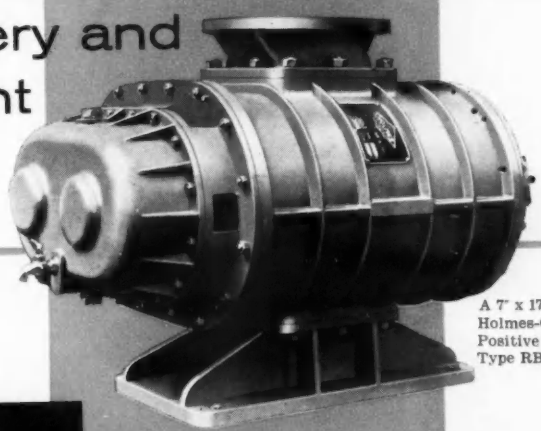

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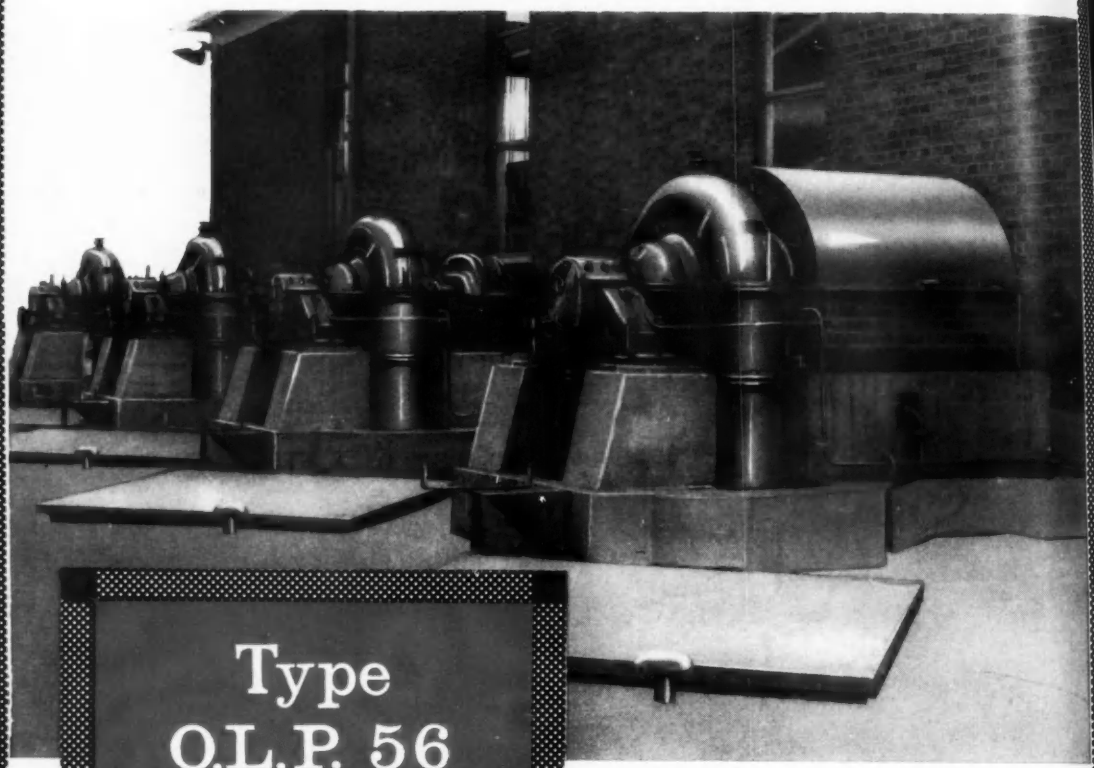

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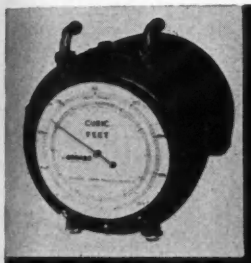

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Gas Journal

VOL. 299 No. 5010 September 9, 1959

IIITH YEAR

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CONTENTS

EDITORIAL COMMENT

The New Leaders - 225
Reforming at Romford - 226

NEWS OF CURRENT EVENTS

Personal - 227
Obituary - 227
Diary - 227
Gas Mains-layer Electrocuted - 228
£40,000 Gas Price Concession by N.G.B. - 228
Mystery of the Missing Wages - 228
Conference for Business Executives - 228
Siberian Fuel Resources - 228
Power-Gas Plant to East Germany - 228
French Thermal Power Plant Uses Natural Gas - 229
N.A.L.G.O. to Move - 229
S.E.G.B. Sports Pavilion Opened - 229

SPECIAL ARTICLES

Dublin—a Survey of the Undertaking. By Colin J. Godbold - 230
Ultra-sonic Dust Precipitation. By E. Zedet - 242

TECHNICAL RECORD

The Romford Reforming Plant—Discussion on the paper by J. Burns and E. R. Stewart - 236

PUBLISHERS' NOTICE, SEE PAGE 249

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the study of movement

So tremendously vigorous and difficult are the movements of Kathakli, dancers must first undergo years of intensive study and special massage in order to withstand the exhausting effect of performances lasting 16 hours.

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Gas Journal

VOLUME 299 No. 5010 SEPTEMBER 9, 1959 111th YEAR

The New Leaders

LAST week's news concerning the impending retirement from the Chairmanship of the Gas Council of Sir Harold Smith, and the appointment of Sir Henry Jones as his successor and Mr. W. K. Hutchison as Deputy Chairman, ended the speculation which has increasingly exercised the minds of most people in the industry during the past few years. Would the Minister favour 'natural' succession or would he make some surprise choice which, within the framework of the Gas Act, might have the effect of altering the machinery or the character of the Gas Council. We now know that he favours the former course and that he has appointed as deputy a man who will have completed 11 years as Chairman of one of the industry's most successful area boards. Thus the industry will continue to have as its leader an engineer, with a chemist as second in command.

Coming as it did just as the 'JOURNAL' was going to press, the announcement did not give us an opportunity of publishing more than a sketchy outline of the careers of Sir Henry and Mr. Hutchison. We therefore propose to rectify the omission.

In the case of Sir Henry the most striking feature is his continuance of a family tradition which for 125 years has associated the name of Jones with some of the best managerial talent the gas industry has known. His great-grandfather, Mr. Robert Jones was engineer and manager of the Commercial Gas Company; his grandfather, Mr. Harry E. Jones, was chairman of several gas companies and an eminent consulting engineer; his father, the late Mr. Frank Harding Jones was president of the South Metropolitan Gas Company. Now Sir Henry, the fourth generation, has achieved the greatest honour of them all.

As we mentioned last week, Sir Henry was articled to the late Sir George Evetts and later became his assistant; ultimately he became deputy chairman of the Wandsworth and District Gas Company and a director of several other companies. What is particularly interesting is that before the war he was engaged in integrating gas companies into more economic units (during the war as a Brigadier 'A' and 'Q' he was more concerned with integrating men), a process which is now being carried out on a much larger scale by the nationalised industry. Despite the substantial linking up of works which has taken place since vesting date, the real task still lies ahead, and we have little doubt that Sir Henry's past experience will stand him in good stead when the national grid, which Sir Harold has championed for years, becomes a reality.

It is also worthy of note that during his chairmanship of the East Midlands Gas Board (1949-52) a particularly virile sales organisation was built up by Mr. H. R. Hart, who was then commercial manager. Thus Sir Henry added an impressive grasp of sales matters to his existing talents in the engineering and management fields. That commercial experience was further expanded in certain of his committee work with the Gas Council and it is to be hoped that as Chairman he will devote some of his energies to strengthening the sales side of the industry which, even today, lags far behind the engineering side in quality and status.

It is common knowledge that Sir Henry is a great committee man, to which activity he devotes an untiring energy. Yet important as his work in this field undoubtedly is, there must be a danger of its making too many demands on his time and thus hampering his efforts on the broader issues. We assume that his new appointment will automatically free him from some of these duties, although such is his interest in, and grasp of, the subjects concerned that he will no doubt give them up with some reluctance.

In Mr. Hutchison we have a chemist with an unusually brilliant career. He read Chemistry at Corpus Christi College, Oxford, where he carried out research into the mechanism of gas reactions, the results of which were recorded by the Royal Society. He joined the Gas Light and Coke Company as a Research Chemist in 1926, but shortly after war broke out he was seconded to the Air Ministry as assistant director of hydrogen

production and in 1942 appointed director of hydrogen production in succession to Viscount Ridley. Later he became director of compressed gases, a position which involved complete responsibility for all the hydrogen used in high-altitude flying by the British and American Air Forces. After the war he returned to the Gas Light and became controller of by-products, and in 1947 he joined the Board of the Company. He is the present President of the Institution of Chemical Engineers, and Past President of the British Road Tar Association and of the Institution of Gas Engineers; he is a vice-President of the British Wood Preserving Association and a former chairman of the British Sulphate of Ammonia Federation. He has also been a member of the Council of the Association of British Chemical Manufacturers and of the National Sulphuric Acid Association and is a member of the Committee on Coal Derivatives set up by the Minister of Power.

With so chemical a background it is perhaps surprising that he should have been appointed Chairman of the South Eastern Gas Board. The fact is, of course, that although chemistry remains his first love, his managerial talents, permit him to perform with distinction in a variety of fields and display the considerable versatility which a board chairmanship demands. It is perhaps worth pointing out that despite its technical prowess, the South Eastern Board is certainly not backward in the art of selling and its Commercial Manager is Chairman of the National Commercial Managers' Committee.

We have mentioned that Mr. Hutchison is a Past President of the I.G.E. So, too, is Sir Henry, and we feel sure that the distinguished association which both men have enjoyed with the Institution will help to strengthen the link between that body and the Gas Council.

In considering both these appointments we feel that one point must be clearly made. It is this—that although the prime requirements of these important posts are courageous leadership, organising ability, and a very profound grasp of all aspects of the industry and its relationship to its neighbours in the fuel firmament—all of which qualities these gentlemen possess—there is also the need for a touch of showmanship and that indefinable something which makes a man's personality register with an audience. The Chairman of the Gas Council is not only the principal spokesman for the gas industry—to many people, a T.V. audience perhaps, he *is* the gas industry. We trust Sir Henry will give full licence to the puckish twinkle and quip modest we have discerned on the few occasions we have heard him from a public platform.

It is difficult to imagine the gas industry scene without Sir Harold whose 53 years in the industry have probably glittered with more distinctions that have those of anyone else in the industry's history. Quite apart from his days at Swan Village and Tottenham, and his subsequent triumphs at Grosvenor Place, Sir Harold has held a remarkable number of offices with societies and organisations associated with the gas industry. He has been president of the Eastern Counties Gas Managers Association and the Southern Association of Gas Managers; president of the Institution of Gas Engineers; chairman of the Federation of Gas Employers; president of the British Road Tar Association and of the British Tar Confederation; chairman of the Prince Regent Tar Company; deputy chairman of National Benzole Company Ltd.; president of the National Benzole Association; and he is a member of the Institution of Civil Engineers. He was formerly a member of the Fuel Research Board and of the Scientific Advisory Council of the Ministry of Fuel and Power.

Other honours include his recent appointment as a Commander (Brother) of the Most Venerable Order of the Hospital of St. John of Jerusalem; his installation, in 1957, as the first Hon. President of the newly formed Houldsworth Society at Leeds University; and, in 1955, as the Master of the Worshipful Company of Paviors. In addition, he is one of the 25 Honorary Fellows of the Society of Engineers. A truly impressive list!

The task of leading the industry during the past ten years (from 1948-1952 Sir Harold was Deputy Chairman) has not been an easy one. It was necessary to bear the labour (Labour?) pains of early nationalisation, smoothing the transition of the industry from private to public ownership; to fuse the efforts of 12 autonymous boards in ' peaceful co-existence '; to keep gas competitive in the face of spiralling coal prices by negotiation and by the introduction of new processes; and to present gas to the world in the most favourable light.

These duties Sir Harold has performed with distinction, but although, thanks to his efforts and those of his colleagues, the industry has successfully weathered the storms, the task facing his successor is no less arduous. Indeed, the most testing years for the industry are yet to come and its survival and prosperity will be dependent on leadership of the highest order. Experience, diplomacy, imagination and courage are the qualities required. Our new leaders will not be found wanting, and we wish them well.

Reforming at Romford

'OIL and the gas industry ' is a phrase often on the lips of gas engineers these days. To many the thought of oil induces dismay, but to many others it brings a relief from ever-present production difficulties. In any and every case the reaction of the gas engineer to the ever-expanding influence of the international oil companies depends on his place and job in the industry. To the industrial gas engineer oil is a menace to the expansion of the use of gas in industry, but the production side of the industry treats the oil industry quite differently, as is shown in the account of the discussion to the paper by Dr. J. Burns and Mr. E. R. Stewart, presented at the I.G.E. meeting at Llandudno last May, which we are publishing this week.

For gas to be competitive with other refined fuels, or even with solid fuels, it is clear that its price must be correct, and if the industry is going to survive, any raw material which ensures this must be seriously considered. The authors' paper on the Romford reforming plant shows how the large quantities of refinery gas available at Shell Haven and also at the Coryton plant of the Mobil Oil Co. Ltd. have been successfully used as a source of raw material for gas making. The technicalities of the Romford plant are set out in detail in the original paper and we have published an account of the works when it was opened by Lord Mills earlier this year.

Personal notes

MR. D. G. HEMMANT, former managing director of Powell Duffryn Technical Services Ltd., has been released for a period of up to one year from September 1 to take up an appointment as Acting Director of the newly-formed Mining Machinery Manufacturers' Export Association. Mr. Hemmant has in consequence resigned his directorship of Powell Duffryn Technical Services Ltd. and his full-time services for the period will be directed towards developing the Association in its early stages. Mr. Hemmant's temporary release has been made by the parent company, Powell Duffryn Ltd., in the full recognition of the potential importance of the Association in developing mining machinery exports.

MR. R. TURNER, Chief Engineer of the company, will be Acting Managing Director during Mr. Hemmant's absence.

MR. P. H. R. LANE has been appointed Head of the newly-formed Members Service Department of the British Welding Research Association. He was previously deputy chief metallurgist of the Association. Other new appointments announced last week are: MR. R. G. BURT, O.B.E., hitherto chief development officer, remains with the Association as Development Consultant, and MR. L. PARKES has taken over as Editor for reports and publications, including the two cover-to-cover translations of Russian monthly welding journals undertaken by the Association. An appointment will shortly be announced of a senior officer as Head of a Design Section in the new Department. The new department combines the functions of the old liaison and publications departments.

MR. EDWARD BENTLEY is to leave the Manchester office to take up the senior post of London Branch Manager of Griffin & George (Sales) Ltd. Other appointments announced by the company are:

MR. KENNETH FREER, who was a buyer in the Manchester office, to the post of Manager at Manchester. Mr. Freer has been with the Company for 20 years.

MR. JAMES BRANSON, former Yorkshire representative, becomes Manchester Assistant Branch Manager.

MR. DOUGLAS SAVAGE remains Field Sales Manager (Northern Area), which he has been for the past two years.

MR. W. BRODIE, formerly Gas Board district manager at Kirriemuir, has been appointed Assistant Distributing Engineer at Leven, Fife. He was with Perth Corporation Gas Department from 1934-45, when he went to Coupar Angus for two years before being appointed to Kirriemuir. The following Service and Sales Superintendents have been appointed: MR. A. ADAMSON (formerly at Kirkcaldy) to Burntisland and district; MR. J. CARGILL (formerly at Perth) to Dunkeld; MR. J. COMRIE (formerly at Crieff) to Blairgowrie; and MR. J. M. DUNCAN (formerly at Callander) to Stirling district.

MR. A. GOLD, of Aberdour, Fife, has retired after 51 years' service in the gas industry. He joined the Cowdenbeath Gas Company in 1908, and became a foreman. He was transferred to Aberdour as gas officer in 1919.

MR. F. W. STOKES has been appointed to the Board of Directors of Powell Duffryn Carbon Products Ltd. Mr. Stokes joined the company in 1951 and was appointed works manager in 1954. Over the past two years he has been closely concerned with the development of the company's activities in machining graphite for nuclear energy and he has been responsible for the design of much of the special tools and machinery employed on this work.

MR. H. J. PODMORE is to be Manager of the new Midlands area sales office of Birlec Ltd., to be situated in the company's main premises in Tyburn Road, Birmingham 24. Mr. Podmore joined the company in April, 1955, as sales manager of the dryer and gas plant division.

Change of address

The address of the Bristol branch office of the English Electric Co. Ltd., is Equity and Law Building, 36/38, Baldwin Street, Bristol, 1. The telephone number remains Bristol 27304. The domestic appliance service depôt remains at 155, Whiteladies Road, Bristol, 8.

Obituary

Mr. W. T. Newton, a director of Woodall-Duckham (Australasia) Pty. Ltd., died suddenly in Melbourne on August 29. He was 56 years old. Mr. Newton joined the company in London in 1923 and remained for 26 years, during which time he was principally with the sales department but also served in the operating, construction and design departments. In 1949 he became divisional engineer of the Walsall and District Division of the West Midlands Gas Board and in 1953 he joined Woodall-Duckham (Australasia) Pty. Ltd. as chief sales engineer. He was appointed to the Board of that company in 1955 and at the time of his death was director in charge of sales, estimating and operating.

S.H.L. writes: There will be many in the industry who will learn with sorrow and regret of the death in Australia of Mr. W. T. Newton. His friends, scattered throughout the country, were made during his many years as representative of Woodall Duckham in London and Manchester. He will long be remembered in the West Midlands Gas Board area as divisional engineer of the Walsall and District Division from 1949 until 1953, during which time he was actively engaged on projects for the planning of the Walsall reconstruction scheme at Pleck works, which was completed this year. His friendly disposition, willingness to bring his colleagues into any project on an equal footing, together with the ability to give helpful advice and encouragement, endeared him to all with whom he came in contact.

MR. FREDERICK E. MILLS, formerly with the North Thames Area Board, died last month aged 62 years. Many of his friends in the gas industry were present at the cremation at Woking.

Mr. Mills worked in the gas industry from 1918 to 1957 and started work with the Brentford Gas Company. After its incorporation with the Gas Light and Coke Company he was concerned with the legal aspects of the control of gas quality. This work culminated in the publication of a book *Gas Calorimetry*, with Hyde in 1929, which is still considered a standard work on the subject. During the war he was with the distribution department of the Gas Light and Coke Company, and in 1945 was appointed to take charge of the general laboratory, Watson House. He retired from the service of North Thames Gas Board in 1957. Mr. Mills published several technical papers, of which one, written with Mr. F. C. Smith, entitled *Carbon Monoxide* was awarded the Bronze Medal of the Institution of Gas Engineers.

Diary

September 15-18. — ASSOCIATION OF PUBLIC LIGHTING ENGINEERS: Aberdeen. Annual Conference.

September 17-18.—SCOTTISH ASSOCIATION OF GAS MANAGERS. Largs. 98th A.G.M.

September 21. — WEST MIDLANDS G.C.C.: Gas Offices, Edmund Street, Birmingham 3. Council meeting at 2.30 p.m.

CABLE PLANS 'CONFUSION'—W.M.G.B. MAINS-LAYER DIED

DESPITE an agreement between all four public utility companies and Dudley (Worcs.) Corporation on the siting of cables and mains within the Borough, a gas mains layer was electrocuted when a compressor-digger he was operating pierced an 11,000 V cable on the Russells Hall estate, Dudley, recently.

A verdict of 'Accidental Death' was returned by the coroner's jury on the mains-layer, Eugene O'Sullivan.

The jury added a rider that in future, to avoid such accidents, the excavating authority should find out from the other authorities what has already been laid in the ground.

Conference agreement

West Midlands Gas Board and Midlands Electricity Board witnesses said that at a conference with local authority officials some time ago, it was agreed that all cables and mains should be laid to an agreed pattern. Starting from the kerb and working inwards towards the houses, the utilities should be Post Office, water, gas and electricity, in that order.

Though they could not be a standard distance apart, owing to differing footpath widths, the general distance in the case of all footpaths was known by all authorities.

No plans have been served on the W.M.G.B. because none had been requested; it was rather a case of the Board serving plans when it made its excavations, so that the M.E.B. could protect its cables, if necessary.

Mr. H. Shackleton, District Manager of the W.M.G.B., said that the siting agreement was reached in July, 1957, and all utilities should supply copies of each main and cable siting to each other. He said that original drawings sent out after the conference were type drawings and that no plan had been received from the M.E.B. of this particular cable, although plans had been sent for other parts of the estate, without the request of the W.M.G.B.

Summing-up, the Coroner told the jury that it seemed somewhat confused whether the W.M.G.B. should have requested the plan, or the M.E.B. presented it.

£40,000 gas price concession by N.G.B.

THE Northern Gas Board has granted a price concession, estimated at £40,000, to certain large-scale industrial gas consumers. The concession is in the form of an over-riding reduction of 1d. per therm net on all gas taken under special agreement terms during August, September and October this year, and July, August and September next year.

It applies to all large-scale consumers whose supplies are governed by special agreements guaranteeing that the consumer will pay for a specified minimum quantity of gas, whether used or not. It is hoped that the reduction will encourage greater industrial use of gas during the summer.

The Board takes large quantities of coke-oven gas from the National Coal Board, and the £40,000 concession will be shared equally by both Boards.

New Scottish Office

West's Piling & Construction Co. Ltd., announces that the new address of its Scottish office is 181-183, West George Street, Glasgow, C.2.

THE MYSTERY OF THE MISSING WAGES

DETECTIVES have been called in to investigate the most baffling robbery in Smethwick for years—the mystery of the missing £3,750 wages at the Rabone Lane gasworks of the West Midlands Gas Board.

There was nothing amiss when office workers reported for duty on Friday morning—no forced locks, no broken glass and no sign of any interference with the safe.

Yet, when the wages were taken from the safe a little while later, it was found that every packet had been carefully split open and the notes taken out.

Police at first believed that the robbery was an 'inside job,' committed by one of the employees at the works, but later this theory was discounted. About 200 people are employed at the works, but with outside staff there were wages for more than 350 in the safe.

ONE-DAY CONFERENCE FOR TIRED TYCOONS

A ONE-DAY conference for business executives, covering general medical subjects, is to be held on Friday, November 20, in the Royal Festival Hall, London.

Nine eminent doctors will speak on the following subjects: Stress and responsibility—their effect on body and mind; overwork and fatigue; exercise and holidays; business travel; high blood pressure and coronary thrombosis; chest disease in the middle-aged man; self-medication, and facing an operation.

Tickets are four guineas, including morning coffee, lunch (with wines), and tea, from the Chest and Heart Association, Tavistock House North, Tavistock Square, London, W.C.1.

Siberian fuel resources 'vast'—*Pravda* article

IN an article in *Pravda*, Academician A. Trofimuk, Director of the Institute of Geology and Geophysics of the U.S.S.R. Academy of Sciences' Siberian division, reviews the immense resources of Siberia, and the progress so far made in prospecting there. Siberia and the Soviet Far East are very rich in oil and natural gas. In Siberia alone the total area expected to contain oil and natural gas already totals over 2,100,000 sq. miles. And, as exploration and prospecting are further developed, vast new deposits may be discovered.

Evidence

Academician Trofimuk points out that the work of prospecting for oil and gas in this part of the U.S.S.R. only started on a large scale after World War II. Up to now only a small part of the promising territory has been explored. Nevertheless, the first deposits found already provide evidence of Siberia's vast resources, and confirm the forecasts made by scientists who had drawn attention to the favourable prospects for finding oil and gas in a number of regions in Siberia, especially in the West Siberian lowlands.

Several large deposits, rich in gas, have been discovered along the lower reaches of the Ob. Oil has been found along the river's middle reaches.

Much evidence of oil and gas existing in large quantities along the lower reaches of the River Yenisei has been found, while oil and gas deposits have also been discovered on the territory lying between the Yenisei and the Lena and in Yakutia. Oil and gas have further been revealed by wells drilled in the Irkutsk region.

Seven-year plan

In the new seven-year plan, prospecting for oil and natural gas in the eastern areas of the U.S.S.R. will be pursued in a more intensive way. Under the plan, geologists, geophysicists and drillers have the job of launching the large-scale production of oil and natural gas in Siberia. When this is done, the industrial centres now being erected in the eastern part of the U.S.S.R. will reap the benefit by having fuel supplies much nearer at hand.

POWER-GAS PLANT TO E. GERMANY

The Power-Gas Corporation Ltd. Stockton-on-Tees, has shipped a gas-making plant to Rostock, in Eastern Germany. Although the Stockton company has produced plant for countries in the Soviet zone during the past few years, this is the first time equipment has been sent direct from Stockton to Iron Curtain countries.

French thermal power plant uses natural gas

THE new thermal power plant at Nantes-Cheviré, France, originally designed to operate on fuel oil and coal, was converted to natural gas fuel during the last phase of construction when the pipe-line carrying the natural gas from Lacq began to reach the lower Loire region.

Since November last year, when Lacq gas was first utilised as Nantes-Cheviré, consumption of this fuel by the plant has progressively increased and now exceeds 26,475,000 cu. ft. a day after three months of operations. This successful result is due to the effort of the engineers of Electricité de France who were required to redesign the installations of the plant, then under construction, to use a different fuel without delay in scheduled operation.

Transformation

While the construction of the pipe-line from the Lacq region was rapidly advancing in the direction of the lower Loire, Electricité de France had to undertake the transformation in record time of extensive equipment originally designed for a totally different fuel system. These changes required the installation of filters and pressure regulators, the reconstruction of combustion chambers, the installation of gas burners and changes in the automatic boiler operation circuits, since the entire plant was designed for remote control and supervision of boilers, as well as generator operation, from a central control room.

At Nantes-Cheviré, boiler draught, pressure regulation and fuel changes are either remote controlled or automatic. The work involved in modifying the original design of the installations also included the installation of a great number of instruments and apparatus such as switches, transistors, photoelectric cells, pressostats and T.V. equipment, but was completed within the prescribed time limits and practically without any interruption in the scheduled operation of the plant.

N.A.L.G.O. TO MOVE

BRITAIN'S biggest 'blackcoat' trade union, the 250,000-strong National and Local Government Officers' Association—is soon to move to new headquarters.

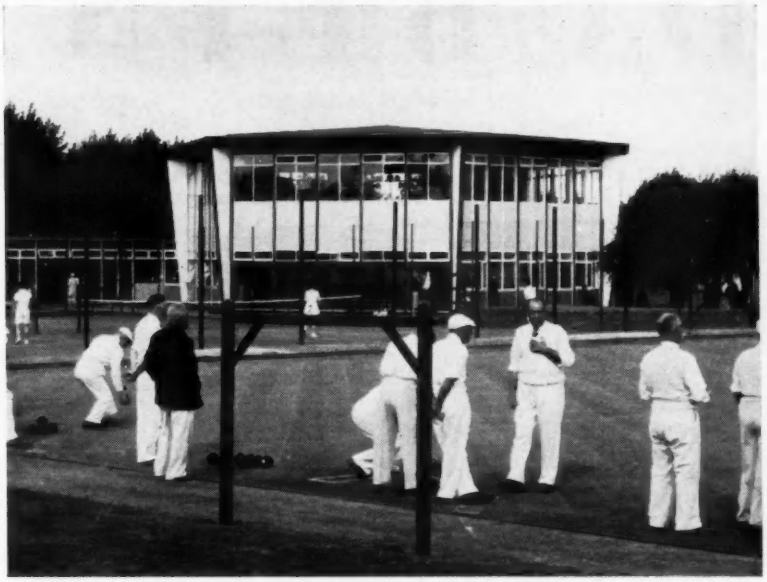
This was announced by Mr. W. C. Anderson, N.A.L.G.O.'s General Secretary, recently.

The Association is leasing an entire wing of the new London headquarters of F. W. Woolworth & Co. Ltd., in Marylebone Road, North-West London, just outside Marylebone station.

The move will be N.A.L.G.O.'s fourth since it was founded 54 years ago.

Mr. Anderson said that the Association hoped to move early next year.

HONOURING AN OLD PROMISE



A general view of the new Metrogas A.S.A. sports pavilion looking across the bowling green and tennis courts, with the assembly hall dominating the scene.

TWENTY-ONE years of frustrated waiting were brought to a happy ending on Saturday, August 29, at Horn Lane, East Greenwich, when the Chairman of the South Eastern Gas Board, Mr. W. K. Hutchison, officially opened a new sports pavilion for the Metrogas Amateur Sports Association.

The former South Metropolitan Gas Company promised the M.A.S.A. a new building in 1933, and approved it in 1938, but the war put a stop to the plans. After nationalisation, the South Eastern Gas Board decided to honour their predecessor's promise, and the result is what surely must be one of the finest sports pavilions in the London area.

In his opening address Mr. Hutchison said that the old pavilion had long since ended its useful days, and it was a great personal pleasure to him to open the new building. 'It is a nice thing to have done this in the spirit of the old company,' he said, 'and we have honoured the 1933 promise. Here is a centre to replace the loss of activities embodied in the former companies, and I shall look forward to seeing it used to the full.'

Striking design

Designed by the Board's architect, Mr. W. Watson, the building has changing and bathing facilities for 14 teams, a large billiards room, an indoor games room, a superb lounge bar, full kitchen facilities and a vast assembly hall. This latter feature is a striking modernistic design, being a glass-walled hexagonal hall, 26 ft. high and 63 ft. wide, and will be used as dining room, ballroom, reception centre and badminton hall.

The building is of timber construction throughout, and is the first such sports pavilion ever to be approved by the London County Council.

The M.A.S.A. has 3,600 members and runs six cricket teams, ten football teams and teams for tennis, bowls, badminton, billiards and table tennis. There are sections for angling, physical training, boxing, motoring, swimming, shooting and photography—and anyone employed by the Board is eligible to join the Association.

Mr. W. K. Hutchison, Chairman of the South Eastern Gas Board, unveiling the plaque which records his opening of the Metrogas Amateur Sports Association's new pavilion at Horne Lane, East Greenwich. Also in the picture are (left) Mr. A. G. C. Ridley, Chairman, M.A.S.A., and (right) Dr. E. V. Evans, formerly managing director of the South Metropolitan Gas Company.

DUBLIN GAS

IN 1898 a young Irish writer named John Millington Synge was persuaded by the poet Yeats to give up the artistic affectations of the Latin Quarter of Paris, and to seek his inspiration from the idiom of his own people.

In the wild fancies of the Arran Islanders and the folk of the fairy-land Wicklow Hills Synge found the words for a number of dramatic masterpieces. Of these at least the *Playboy of the Western World* has become a national treasure.

Dubliners, however, were at first rather slow to appreciate the play's merits.

Calling his play 'a slander on the fair name of Ireland' patriots who believed in art for propaganda's sake smashed up the opening night at the Abbey Theatre on January 26, 1907, and subsequent performances with a zest that would have frightened the mid-18th century aristocratic terrorists among English audiences.

This controversy, typical in the early days, was perhaps the most significant birth-pang in the development of the Irish Dramatic Movement which began at the turn of the century and which was starred with such names as Yeats and Synge, Lady Gregory and Sean O'Casey.

The Movement revitalised the Irishman's inherent love of the folk-tale which is drama.

Not so tenuous

This line of approach to the story of the Alliance & Dublin Consumers' Gas Company may seem tenuous but, were it not for the traditional drawing-power of the stage in and around that romantic city, the phenomenal surge forward of sales of appliances and gas of recent years might not have taken place.

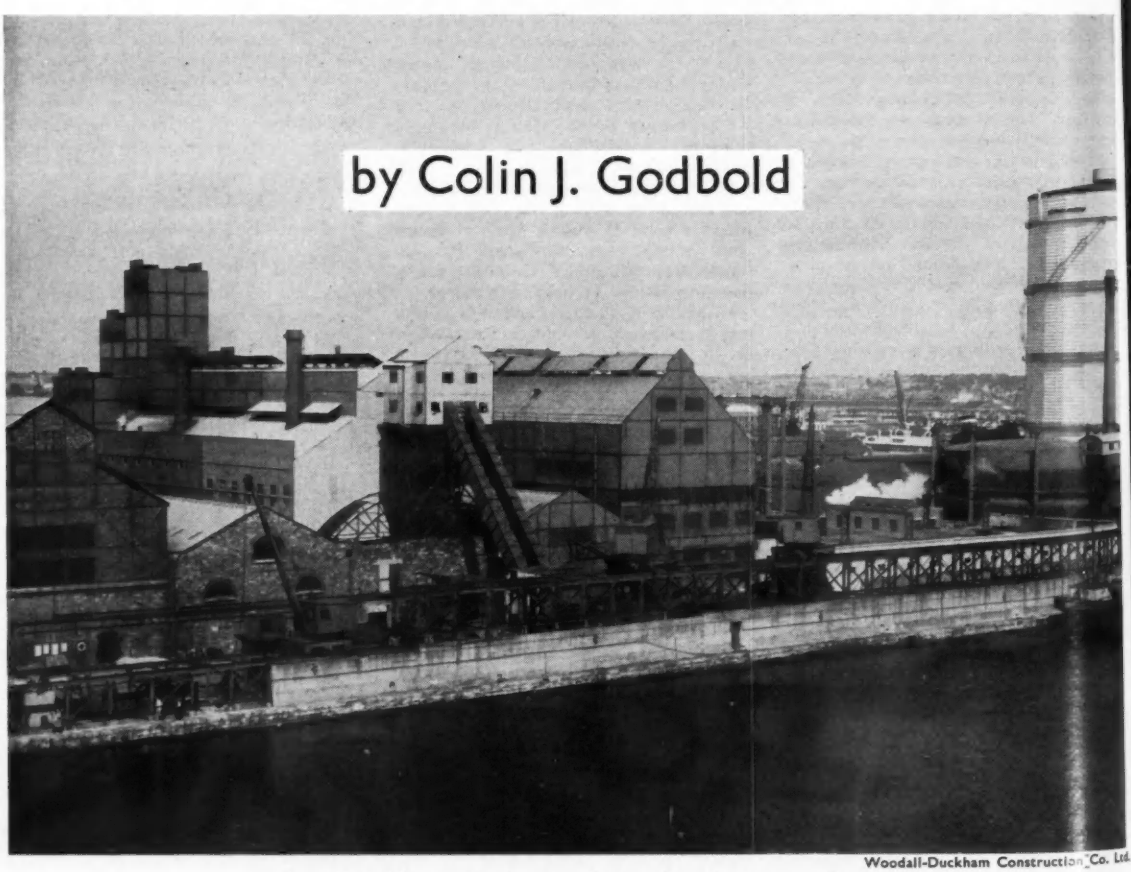
Some of the most important repertory in Ireland today is sponsored by the Alliance & Dublin Consumers' Gas Company.

The General Manager of the Company, Mr. N. J. Robertson, is a Scot. But after 20 years in Ireland he can speak with authority on the needs of his customers.

'They are very impressed,' he says, 'by informal friendship. Magnificent showroms are all very well, but ostentation alone might indicate a prohibitive expense to people living in the villages and rural districts around Dublin.'

His 170,000 consumers, and those he hopes to add to that figure need to be brought to the showrooms (which are magnificent enough) by an imaginative approach.

by Colin J. Godbold



Woodall-Duckham Construction Co. Ltd.

Part of Dublin works, showing the locality of the new plant.

Sales of appliances double in two years . . . industrial and commercial consumption increases 8% annually . . . new plant is completed ahead of schedule

. . . A DRAMATIC—IN MORE THAN ONE SENSE—POST-WAR RECOVERY

And what could be more vivid than the drama?

What the gas company has done may be inferred from this illustration.

When I asked at my hotel what play he would recommend me to see one night in Dublin, the manager chose, first, Shaw's *St. Joan* (Siobhan McKenna was starring, her name freshly on everybody's lips because of her controversial TV comments on such topics as the IRA), and secondly *Streetcar Named Desire* at 'the gas theatre' as he called it, at Dún Laoghaire.

The manager had seen it himself, and so had a lot of other people I spoke to. Also, there was wide publicity when the principal repertory company—the Globe—went on tour.

The strings attached to the gas company's patronage are not exactly inhibiting; simply, the audience must be encouraged to take coffee in the gas showroom below the theatre during two intervals. One might wish for such spacious facilities in London theatres!

But for Alliance & Dublin, the productions of the repertory groups involved could not be of such a high standard, if they could appear at all.

Traditional

Obviously, the immediate result is that a broad cross-section of a theatre-conscious populace, relying on the 'Gas Company' for a consistently virile succession of up-to-date plays, is becoming conscious also, in a most pleasant context, of the fact that gas appliances are graceful in appearance, efficient, cheap to buy and to run.

Hardly less obvious is attainment of the broader ideal of prestige and integration with the traditional life of Dublin town.

But this really remarkable contribution to the professional theatre of Ireland is by no means the only stage entertainment that the Gas Company provides for Dubliners.

Mr. Robertson, whose friendly nature, golfing and singing ability (in a country where those three things are taken as seriously as the elements) make him one of the most popular members of the Irish Gas Association (of which he is Director), has one pet theory which he *will* see put into practice whatever effort it costs him and his staff: That showrooms should have some form of *active* display every day.

At Headquarters in D'Olier Street, where there is also a theatre on the first floor, this ideal is maintained with demonstrations of culinary techniques to housewives and schoolchildren, or full-dress musical comedies (written by the General Manager) followed by fashion displays by leading houses.

A few weeks ago a 2½-hour evening show had such an attractive bill that up to 500 people nightly were being turned away from the 600-seat theatre, in spite of the fact that so many were content to stand at the back of the hall and elsewhere that they somehow managed almost to double the proper number.

In packed the Mrs. O'Reillys and Mrs. Finnegans, bringing in their wake, sometimes, their husbands, to see a musical sketch written entirely by Mr. Robertson. Called 'Fare and Lovely,' the show had a distinctly Shavian flavour, with such lyrics as 'Won't You Buy My Pretty Flowers,' 'A Little Bit of Dough,' and right at the very end before the customers could take evasive action 'You've Gotta Have Gas.'

The gown worn by Eliza is by the House of Cassidy, and her hair is styled by Haute Coiffure d'Urlande.' Not the opening lines of a Donald Swann-song, but a hint that the programme for the evening would be completed by a display of 78 fashion styles, modelled by leading mannequins, and demonstrations by a famous beauty-aids firm.

Attractions on that scale are presented about three times a year at the headquarters of the company; but if there is no entertainment of their own, other organisations are encouraged to use the theatre. Students from local colleges and schools often exercise their talents there.

As performances by outside bodies attract their own special audiences, the flow of people going through the showrooms is constantly varying.

It must be stressed that at the shows held on the company's premises and in the suburban halls, the subject of gas is only discreetly introduced, the bait, good humour and entertainment, concealing the commercial hooks.

Anyone who has been greeted with the friendliest 'Good evening' in the world at precisely one minute past noon in the rural areas around Dublin would know how far a hot-stuff salesman could get, although, of course, there is an adequate outdoor sales staff and a 'prospect' scheme for other employees.

But these are the ways Mr. Robertson and his company consider to be most fruitful in their part of the world: To get more people to see the contents of the four showrooms more often than would be possible by conventional means, and to identify the company with the community.

Appliance sales

As all these strenuous and sometimes, one might think, expensive activities are concurrent with the more usual forms of advertising and publicity, what visible return is there?

During the past two years sales and rentals of gas appliances have doubled . . . in a country where 42 gas undertakings remain out of the 73 that existed 25 years ago.

And, contemplating such virility, it

Mr. Robertson's musical comedies have great drawing power. Big crowds turned up for 'Fare and Lovely,' which had a coincidental resemblance to 'My Fair Lady.' Another coincidence (right) was the gas-equipped kitchen.

has to be remembered that competition comes from three sources which have very great advantages: The state-encouraged peat turf industry, the state-owned electricity industry, and oil.

Whereas prices of imported coal (190,000 tons a year) essential to maintain gas production have been crippling, electricity can be made by using local peat.

It is only recently that any freedom has been envisaged from being at the mercy of European coal prices and freight rates.

Partly by taking advantage of reduced shipping costs from America, the Alliance & Dublin Consumers' Gas Company brought down its gas prices three times during the past financial year.

Even so, with high competition, there is only one way in which to survive, let alone prosper. That is, to understand the peculiar regional requirements and to build goodwill on the customer's own terms. This has been an almost impossible task until two or three years ago.

Gas rationed

During the war and for a while after, the Company had to introduce a strict rationing scheme, operating gas supplies for restricted hours (sometimes only 4½ hours a day). By the end of the war, consumption had dropped by 28% on the 1939 figure.

Until 1956 there could be no substantial gas sales promotion policy; for the preceding ten years was influenced by inadequate coal supplies and inability to replace and repair plant dilapidated by steel and other shortages.

But now plant capacity is adequate the commercial policy has undergone radical change and gas consumption shows a healthy growth.

Tolerance

Indifference to time, the Irishman's well-known, maddening, and carefully preserved prerogative, makes bill-collection quite a problem. But an essential qualification for making good in that country is the ability to invert obstacles into landmarks for success.

By tackling defaulters with sympathy and understanding the company adds to the vast goodwill it has already created.

Those who want something for nothing are dealt with in the usual way, of course, but painstaking care is applied to separate these from people who are unable to pay due to unemployment, sickness, or through no fault of their own. This tolerance is important where unemployment is of a high incidence; obviously a potential customer considers these things in the process of getting credit by hire-purchase, rental or meter.

Appliance on-cost additions are lower than in Great Britain, which precludes attractive commission terms to dealers. Accordingly, dealer relations are modest as compared with the schemes of British gas boards. Although the company's preference is for intimate contact with customers, there is, in fact, a flexible attitude towards the question of a stronger dealership tie-up, in other words, the advisability of such a course is constantly under discussion, but at present the existing policy is working too well to risk disturbing the selling climate. By the same mark plumbers and heating contractors are not used; they would have to be if the promotional schemes were broadened beyond their already adequate scopes.

But the fitting staff of Alliance & Dublin have been cheerfully working 'excessive' overtime for the past 18 months—despite the augmentation to their ranks and acceleration of maximum promotion of apprentices before completion of their time.

Industrial users

Industrial and commercial users now take 22½% of the total output of gas, in spite of the fact that heavy industry in the Republic hardly exists and that gas is more expensive in some instances.

The reason why such sales are achieved, is that the company has realised, as the British gas industry has, that the chief advantages are reliability and flexible heat control.

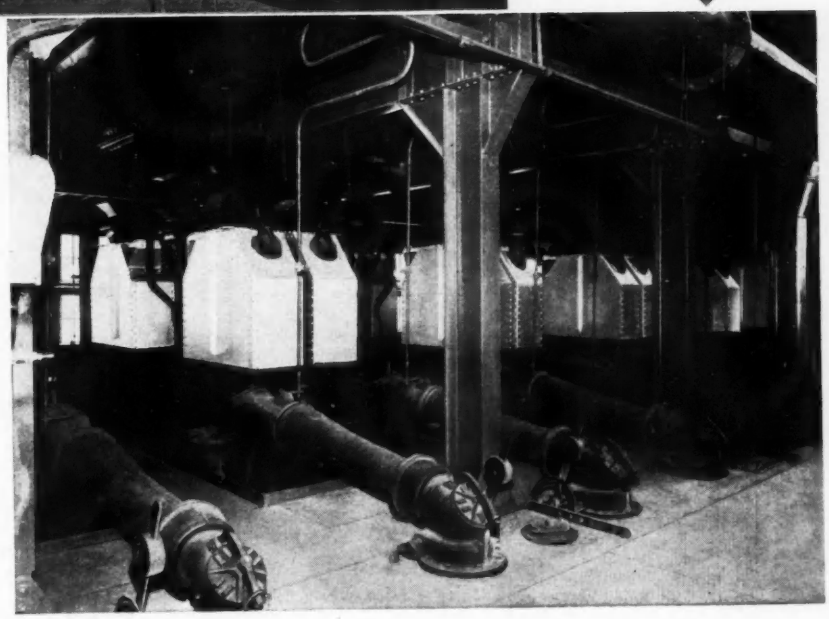
Together with new tariffs and recent reductions in basic price, these things have lent strength to what amounts to a consistent sales promotion campaign since that inevitable line of demarcation the war.

Giving cohesion to the various enticements to the industrial and commercial user, however, is once again the personal approach. In these fields that means specialised service.

In a paper to the Irish Gas Association this year, Mr. A. L. Allen, Distribution Engineer, pointed out

The coke extractors, coke hoppers and water sealed discharge doors beneath the retorts

The auxiliary coal supply hoppers, gas off-takes and valves at the top charging level



The new continuous vertical retort installation for the Alliance and Dublin Consumers' Gas Company

The new installation includes twenty-four W-D Lambent Heated Continuous Vertical Retorts capable of carbonising 194 tons of coal a day and of producing therefrom 3¼ million cubic feet of 475 B.t.u. gas

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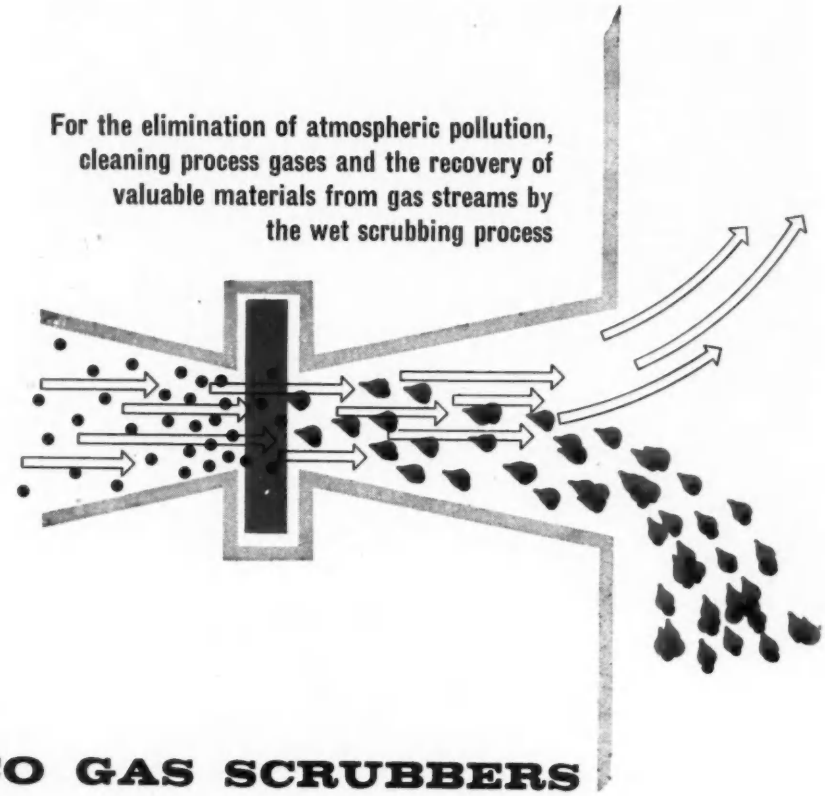

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that consumers readily appreciated these factors which reduced wastage from rejected products and also gave uniformity of quality.

That gas could therefore be more economical and have the balance of advantage.

He said: 'The high and increasing cost of labour also operates to our advantage in competition with solid fuels.

'Cleanliness, and the absence of handling costs and ash disposal are further recommendations. The avoidance of fuel storage requirements and the elimination of contamination appeals particularly to consumers specially concerned with hygiene and those whose premises are limited or above ground level.'

Window show

In March last year a large-scale exhibition of industrial and commercial equipment was held at D'Olier Street, in which 50 manufacturers co-operated.

Their contributions included a demonstration of glass cutting-off and edge fusion in one of the showroom windows. It was a unique opportunity to stage a specific process, as that particular tradesman suffers no competitor in Dublin as yet.

Films were shown to industrialists during the 16 days of the exhibition. Invitations went out to local authority officials, architects and engineers, consumers and potential consumers, and parties of engineering students. There was a lot to see.

It could be coincidence of course but since this effort the average increase of 3.5% a year in these forms of gas usage has more than doubled, to 8%.

Doubled, it may be noted, is a word which has found its way into this article before in relation to the progress of the Alliance and Dublin Consumers' Gas Company.

New c.v.r. bench needed no modification during building

THE newly-completed bench of 24 continuous vertical retorts is designed to increase the capacity of Dublin gasworks by 3 mill. cu.ft. a day. The works has been producing gas at the rate of about 21 mill. therms a year.

This latest manifestation of Alliance & Dublin's confidence in sales expansion was erected by the Woodall-Duckham Construction Co., Ltd., nearly two months ahead of schedule.

The extraordinary pace was achieved largely because, as a result of thorough agreement being reached in the early planning stages, no alterations or modifications were needed during the building operations.

Continuation plant

Replacing the last of the horizontal benches, the new plant occupies No. 6 retort house which has been greatly altered, and is a continuation of a Glover-West plant. Where possible old walls have been retained,

Dublin works—before the new plant was erected.

Woodall-Duckham Construction Co. Ltd.

Interior of the new retort house at producer charging level, showing producer gas necks on the left, the charging lids each with its igniting gas flame, and the overhead beam for the charging skip.

additional building being carried out by raising their height with steel-framed brick panelling. Some new mass concrete foundations, however, have been laid down, reinforced by bar where necessary.

Full use has been made of existing coal and coke handling facilities and gas mains.

The 82-in. lambent heated c.v. retorts are set in double line complete with step grate producers, a new chimney and a waste heat boiler.

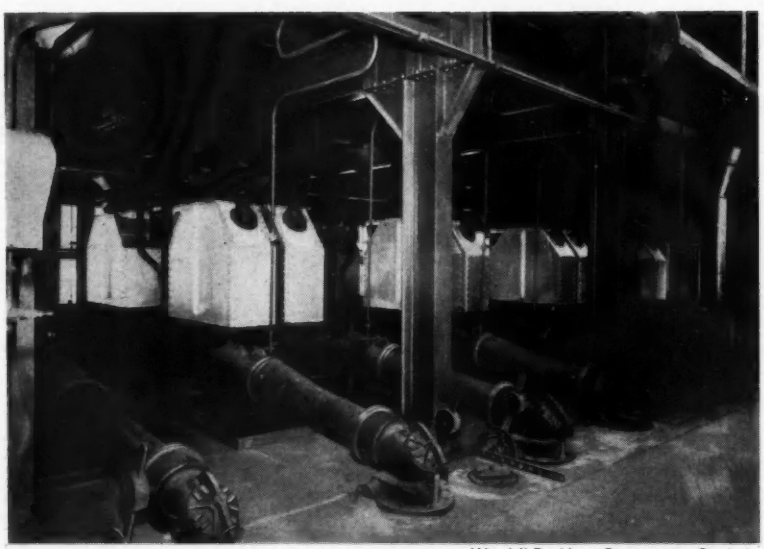
Settings are of the orthodox Woodall-Duckham design in high grade silica in the zones of maximum temperature incorporating individual secondary air and gas flue dampers.

To cut heat losses from radiation to a minimum, both side walls of the bench are constructed of firebrick and special flush-faced insulating bricks.

On top of the bench there are special insulating bricks with a covering course of red bricks set on edge.

The retorts are heated by producer gas from four step grate producers built in an independent battery at retort house floor level on one side of the bench. Gas from any producer can be taken to the flues of any retort.

The producers are 6 ft. 4½ in. wide by 7 ft. 1½ in. deep with sufficient grate areas to heat 24 retorts when burning run-of-retort coke and any one can be shut down without interfering with the others.



Woodall-Duckham Construction Co. Ltd.

At retort charging level, showing the coal boxes and the gas off-takes entering the collecting main.

Common flue

There is a common internal gas flue with twelve rectangular mild steel gas necks which are lined with insulating firebrick and special insulating brick.

The waste gas main and the branch connections to the bench are also constructed of mild steel and refractory lined.

The waste heat boiler, of the multi-tubular fire tube type, is 5 ft. 9 in. in diameter by 15 ft. long with a heating surface of 1,287 sq. ft. It raises steam at 120 p.s.i.

An electrically-driven Sirocco induced-draught fan, big enough to deal with all gases from the retorts, draws the waste gases through the boiler and discharges them through the chimney—a brick-lined steel structure 103 ft. high.

The top 15 ft. of the chimney is lined with acid-resisting bricks set in Prodor cement; the remainder with firebrick, the lower part 9 in. thick and the upper 6 in.

The boiler is equipped with the usual ancillary fittings, including a Thermofeed constant water level device, high and low water alarms, and a Tricone heater.

Feedwater is supplied by two Weir steam-driven pumps, one standby, capable of dealing with 400 gal. of water an hour. There is also a tubular type feedwater heater.

Duplicate conveyors

Coal is brought by existing unloading and handling equipment from boats at the canal quay to duplicate 42-in. belt conveyors—one standby—of 100 tons an hour capacity.

These serve the Glover-West No. 5 retort house and also feed the coal bunker above the new retort bench, which holds sufficient coal for 48 hours' working at a throughput of 8.1 tons per retort per day.

Coke is discharged at the base of the retort by hydraulically-operated extractors into cast iron ancillary hoppers holding two hour's make of coke.

Extractor driving equipment consists of two 3-in. diameter hydraulic cylinders and pistons, connected to two lines of reciprocating bars, each extending on one side of the bench.

Cast iron adjustable driving blocks engage rocking levers mounted on the coke extractor wheels.

Two pumping sets, one standby driven by constant speed motors, are contained in a cabinet at floor level.

On to two 30-in. belt conveyors, which have been extended to pass under the new bench, coke is directed by a hand-propelled travelling coke chute and passes to the coke grading plant.

Gas off-takes are liquor flushed and fitted with dish valves. The two collecting mains of welded construction on each side of the bench fall towards the centre to the cleaning well and tar and liquor overflow.

A 15-in. uptake main from each collecting main is coupled to an 18-in. foul main from which a 16-in. branch connects it to a relief and purge pipe. From the foul main gas passes through a butterfly valve working in conjunction with a Bryan Donkin gas relay type gas regulator, to an existing 30-in. suction main.

Tar and liquor from the collecting mains is passed to a mild steel separating tank with a decanting compartment of 2,100 gal. capacity and a clean liquor compartment of 400 gal. capacity.

Two new liquor pumps supplied by Worthington-Simpson Ltd. have been installed. One is a standby and each is electrically driven and capable of pumping 4,000 gal. an hour.

All the electrical equipment is 340 V. 3 phase, 50 cycles a.c.; the motors are of the Lancashire Dynamo & Crypto squirrel cage gasworks type. Starter gear has been supplied by Brookhirst Switchgear, Ltd.

Of the total output of the Dublin works 80 mill. cu.ft. a week is coal gas The other 35 mill. is water gas from four 2½ mill. cu.ft. a day Humphreys & Glasgow plants.

Two out of the six retort houses are closed down, although No. 2 house may be put into commission again.

Nos. 3 and 4 houses between them contain three benches of 32 50-in. Glover-West verticals, with a total capacity of 7.9 mill. cu.ft. of gas a day.

No. 5 retort house has 48 50-in. Glover-West verticals with a capacity of 4.7 mill. cu.ft. a day.

Rest of works

In addition to the 190,000 tons of coal used each year, mentioned earlier, approximately a million gal. of gas oil is consumed.

The works took 2.47 mill. units of electricity during 1958 for its manufacturing and distribution processes. Its steam plant produces about 60,000 lb. an hour for use on the works.

Woodall-Duckham Construction Co. Ltd.

At the base of the retort bench showing the two sets of coke extractors and the cast iron coke hoppers. In the well below the setting are the twin 30-in. belt conveyors.

On the distribution side, there are three 9 mill. cu.ft. a day Holmes-Connersville exhausters, driven by Bellis & Morcom steam engines.

Pumping the gas are three Bryan Donkin 300,000 cu.ft. a day compressors, with a Bryan Donkin electrically-driven booster of 500,000 cu.ft. an hour capacity.

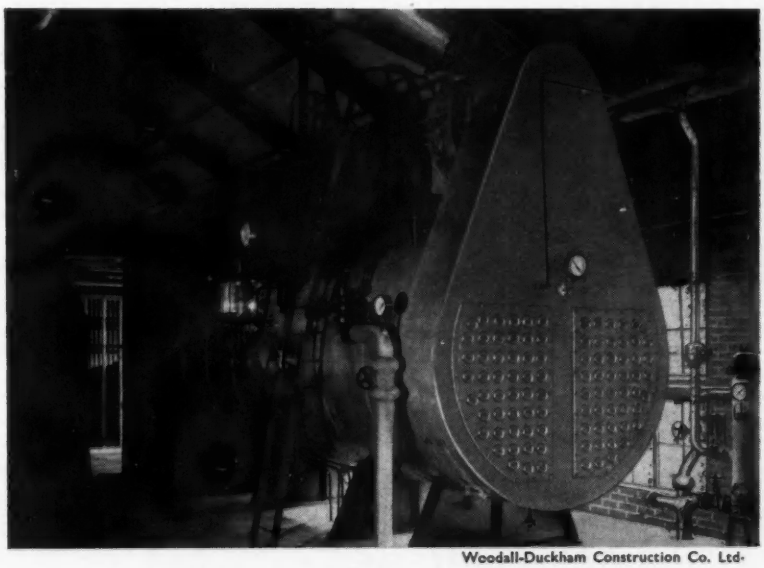
The condensers have the capacity for 105 mill. cu.ft. a week of coal gas and 42 mill. cu.ft. of water gas.

The exhausters have a capacity of 126 mill. cu.ft. a week coal gas, and 56 mill. cu.ft. water gas; the detarrers could take 140 mill. cu.ft. coal gas and 105 mill. cu.ft. water gas.

Both the coal gas detarrers and washers (which have the same capacity) are of the Holmes static type.

Working holder capacity is 10 mill. cu.ft. and comprises a M.A.N. waterless holder for 3 mill. cu.ft., two spirally-guided holders of 1½ and 2¾ mill. cu.ft., and two column-guided holders to take the balance.

Among the by-products are coke, prepared tar (of which 1,909,600 gal. was sold last year) and creosote.



Woodall-Duckham Construction Co. Ltd.

A view of the waste heat boiler raising steam at 120 p.s.i.

*Discussion of Communication No. 550**

THE ROMFORD REFORMING PLANT

By J. Burns and **E. R. Stewart**

G.M., B.Sc., Ph.D., M.Inst.Gas E., CHIEF ENGINEER,

A.M.I.Mech.E., Assoc.M.Inst.Gas E., STATION ENGINEER,

NORTH THAMES GAS BOARD.

Mr. E. R. Stewart presented the paper by Dr. Burns and himself, and in doing so drew attention to an error on [p. 25], where the line marked (b) immediately above the diagram showed the expression Overall Efficiency; the calculation should be reversed, with therms of final gas over therms of total refinery gas used.

Mr. W. K. Hutchison, C.B.E., Chairman of the South Eastern Gas Board, said in opening the discussion, that great interest had been aroused by the simultaneous creation of two entirely new major works to the east of London, Romford on the north and Isle of Grain on the south of the river, both dependent on oil products, and with many other apparent points of similarity.

Both were conceived and planned at a time when it appeared that the carbonising coal of the type which had been the mainstay of the London gas industry for more than a century was going to be too scarce and was already undoubtedly too dear too provide a sound basis for any further expansion of the industry.

Capture of market

A third factor had now intervened to make the construction and operation of plant such as this not only desirable but absolutely necessary.

'I refer, of course, to the capture of a large part of the industrial and commercial coke market by oil, and the worse than half-hearted approach of local authorities which has made the clean air ideal seem to some of us even further away than ever.

'So it has become of extreme urgency to bring the coke situation under control. There is only one possible way to do that, and that is to make a substantial quantity of base load gas by means other than the carbonisation of coal. Towards that end —and a very important end it is to us in the industry—both the works I have mentioned have already made a substantial contribution.

'I have referred to the apparent similarities between the two installations, but I think that the purpose of opening this discussion would be best served if I were to point out what are the differences both in conception and operation.

'The Romford plant, it seems to me, can best be described as a one-purpose tailor-made plant designed to secure, with maximum efficiency and the least capital cost, the production of gas from a single specified and guaranteed gaseous feedstock. At the moment, as far as I can see, it is contemplated to have one alternative feedstock, which may be a light distillate, presumably to be used either for economic reasons or in an emergency. When the authors have the pleasure of using a light distillate, I shall be happy to commiserate with them on some of the difficulties that immediately arise.

'The Isle of Grain works of the South Eastern Gas Board, on the other hand, was planned around a completely different conception, and that as of a plant capable of using any feedstock whatever that the refinery might have in surplus at any one time—and that also includes crude oil—but at the time of its planning the arrangement did not include nor contemplate any refinery gas whatever.

'The location of both plants to the east of London was decided in each case by convenience of access to the feedstock, and really points a curious parallel to the movement of gasworks eastwards to Becton and East Greenwich in the 19th century towards the source of coal entry in the Thames.

'Romford has been conveniently sited at the perimeter of the main centre of consumption in the North Thames area, and it is very clear from the paper that most careful consideration was given to the relative cases for transmission of refinery gas to point of usage or the alternative of manufacturing at the point of production and transmission of the finished gas.

'In the South Eastern area, on the other hand, there is a large centre of consumption much further east in the Medway towns.

'The final decision to site the plant on the perimeter of the refinery at the Isle of Grain took that into account, but, of course, that decision also enables the whole range of feedstocks from oil to light distillate, and now I may say gas, to be received by pipe-line with no storage necessary on the works, and many other services also are provided by the refinery.

'It is not my intention to deal in any detail with operations at the Isle of Grain, even to make comparisons with what we have been told of Romford, because I know that Mr. Stott has been invited to prepare—and is doing so—a paper for the Institution on that correlation at our next Summer meeting.

Suitable

'I will only say at this stage that we are very satisfied with the installation as a whole, and that the regenerative principle which has been a feature of the plant from the beginning and the catalyst used have both proved very suitable for our main purpose and the purpose for which that plant was designed, namely, the efficient conversion of the widest possible range of feedstocks.

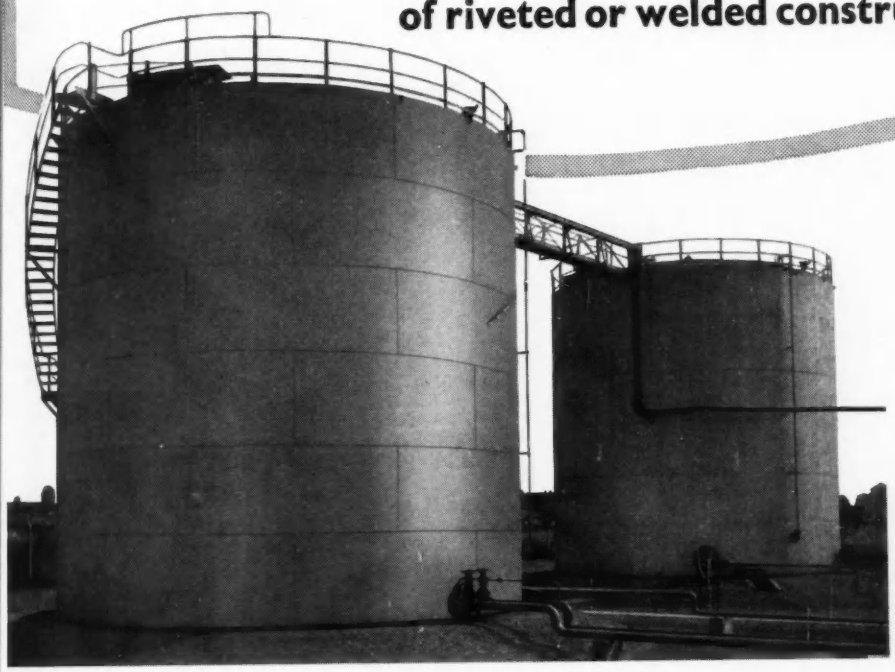
'Indeed, I have just been informed that we are now in a situation where, for a variety of reasons, out of four generators, one is working on a very heavy oil producing a very heavy tar, one is working on a light distillate producing a very light carbon—it also produces gas, I imagine!—the third is working on refinery gas and producing not much else but gas, and the fourth is no doubt waiting for whatever comes along! But we do find that the plant is practical.

'There is one conclusion which I would like to state now, in confirmation of observations made by the authors of the paper, and that is that the lighter the feedstock the better conversion efficiency and the higher the output of the plant. The authors' experience is with gases in the range of a carbon/hydrogen ratio of about 3 to 4.36. Our experience, of course, down to a heavy oil takes us right

* *An abstract of the paper, delivered to the 96th A.G.M. of the Institution of Gas Engineers, was published in our June 10 issue.*

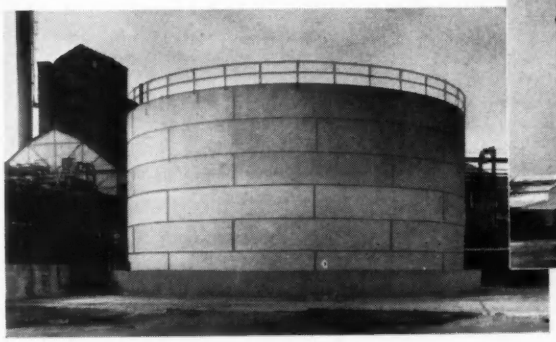
Mild Steel Storage Tanks

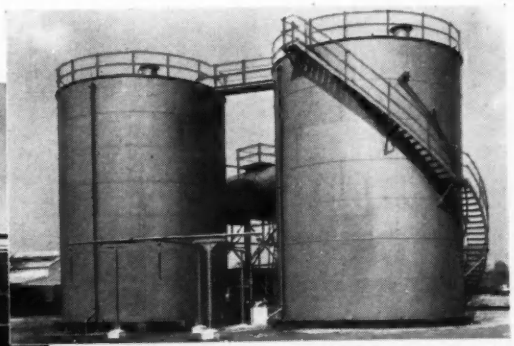
of riveted or welded construction



M.S welded Fuel Oil Storage Tanks each 35 ft. dia. x 35 ft. high, 200,000 galls. capacity, at Gloucester, for the South Western Gas Board.

500,000 galls. capacity Oil Storage Tank 60 ft. dia. x 29 ft. high, at Southampton, for the Southern Gas Board.





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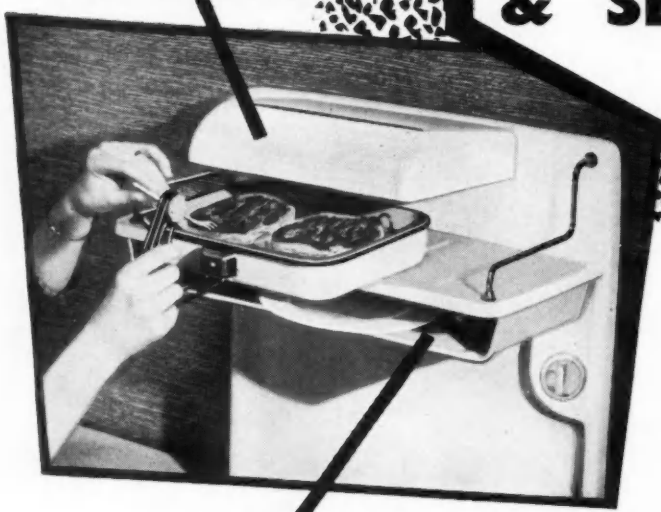

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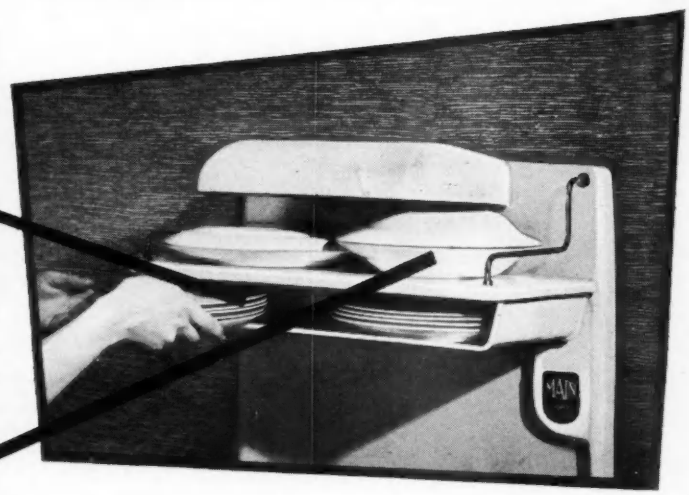

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through that range and up to a carbon/hydrogen ratio of approximately 8, I think it is most important to bear that factor in mind when considering different plants for different purposes.'

Mr. L. Belchetz, of the Shell Refining Co. Ltd.: "I represent one of your competitors in the oil industry, and after some of the things said this morning, I feel that I ought to be apprehensive about addressing such a gathering, but fortunately, in this instance, I am extremely happy to be associated so closely with the gas industry, and I should like also to add my congratulations to the authors of the paper for the very clear and interesting manner in which they have presented the results of their work.

'It is a source of some gratification to my company, as major suppliers of the gas to Romford, that the North Thames Gas Board has been so successful in dealing with the fairly wide variations in composition of its intake material. These are inevitable in a refinery which processes such a variety of crudes and which is subject to the usual seasonal fluctuations in product demand.

Gas Derivatives

'For those who are not familiar with the operations at Shell Haven, I should remark that the gas is derived from three sources—from crude distillation, from the platformer and, most important of all, from the thermal reformer. By far the largest quantity is derived from the last-mentioned plant, and in fact the contract has been developed round the ability of this plant to maintain regular supplies. It is unfortunate from the gas industry's point of view that the tail gas from this unit tends to be olefinic in character, but control of composition is afforded by our ability to incorporate paraffins from the crude distillation units and hydrogen from the platformer. However, we plan to use this hydrogen in a hydrodesulphurisation plant which will come into operation towards the end of this year, so that the future gas from Shell Haven will tend, in the main, to be higher in calorific value but not necessarily more olefinic.

'The availability of gas from any refinery is dependent on the type of cracking operation practised. As I have already informed you, Shell Haven is a relatively simple refinery and it is to be expected, therefore, that its production of gas will be rather restricted. The situation on a refinery like Stanlow, on the other hand, where, in addition to a platformer and thermal reformer there is also a large fluid cat. cracker, gas is produced in large quantities. The olefines are, to all intents and purposes, consumed in chemical plants or converted to gasoline by polymerisation, and in this manner the residual gas tends to be saturated in character.

'The main stream has a calorific value of roughly 900-1,000 B.t.u. per cu.ft., but substantial quantities of propane and butane could be incorporated in the supply if the dew point specification were not unduly restrictive. You will see, therefore, that on paper potentially more gas could be supplied from a refinery like Stanlow than from one like Shell Haven.

'However, because of the complexity of the plants at Stanlow, shutdowns tend to be longer—the shutdown of the cat. cracker, for example, occupies approximately one month, during which period there may be little or no gas whatever for sale. One can also not discount the possibility of unscheduled shutdowns of short duration, and for this reason one is inclined to be rather conservative in arriving at a figure which one would be prepared to supply on a guaranteed basis.

'Mention has been made in the paper of the fact that in February and March of any year the Shell Haven gas has had to conform with a dew point specification of 28°F. maximum. This restriction has represented an obstacle in our operations, since it is not always practicable on a refinery to prevent the entrainment of, say, 0.1% of heavier than C_4 hydrocarbons in the product gas because of limitations of the fractionating equipment. This small percentage of heavy hydrocarbons has an inordinate effect in raising the dew point and can at times force a refinery to withdraw certain streams which would otherwise be very acceptable in the overall supply.

'In view of this, some investigations into the manner in which subsurface temperatures varied with ambient temperature were conducted in collaboration with the North Thames Gas Board last winter. It was found that, while a gas flowing in a line located above ground rapidly arrived at ambient temperature, temperatures at a depth of 4 ft. below ground level tended to remain constant at about 44°F. Temperatures of 44°F. were also recorded at the Romford end of the board's line. On the basis of this evidence, it has been possible to agree to a considerable relaxation in the dew point specification for the gas from Shell Haven, and this has enabled us to offer larger quantities on a basis of guaranteed continuity. We are anxious not to go too fast in this direction, since we have only had one year's operation behind us, but the relaxation in dew point has undoubtedly afforded us a most welcome degree of freedom.

Adverse effect

'We are a little worried, however, about the possible adverse effect of olefinicity on the efficiency of the gas reforming plant, particularly in relation to the tendency of olefines to form carbon. This has not been specifically mentioned in the paper, but I understand that olefines in excess of 20% by volume can be troublesome. Has the possibility of separating the carbon with the aid of a cyclone, for example, been investigated, as an alternative to reliance on the sulphur boxes to filter out the material?

'While, in general, we expect to keep the olefine content within the limit of 20%, we may occasionally have on hand large quantities of reformer gas which we might wish to put into the line but which we would have to withhold because of a possible adverse effect on the Romford operation. I feel that it would be a good thing if this problem were to be studied further, since the solution would provide an additional degree of flexibility which would undoubtedly benefit us as the supplier and I believe you, too, as the consumer. We would, of course, know beforehand when we would be embarking on a high thermal reforming programme and would, therefore, be able to give good warning of any changes in the composition of the gas.

Uncertain continuity

'I believe it must be apparent from what I have said that for the greater part of the year we produce much more gas than we can contract to supply because of the uncertain continuity. I am pleased to hear that the use of p.f.d. interchangeably with refinery gas is to be investigated in the very near future. I hope that these experiments will be successful and that by holding stocks of p.f.d. on hand it will be possible to minimise the need to hold standby plant in readiness in the event of a temporary reduction in refinery gas availability. Such an arrangement might over the year increase the supply from Shell Haven by some 50%.

'I conclusion, I would like to express my pleasure at having been asked to participate in this discussion. I heartily endorse the references to the cordial relations which exist between the Shell Haven and Romford personnel, and the success of the operation owes a great deal to the good understanding and friendly spirit of co-operation.'

Mr. G. V. C. Davies, Director of Humphreys & Glasgow, Ltd.: My company was greatly honoured in being entrusted with the contract for building the Romford plant, and it has been of special interest to me, because I was fortunate to be concerned with the project from the start. I think everyone will agree that there is particular satisfaction in seeing designs translated from the drawing-board to reality and the plant doing what we said it would do. It may be interesting, therefore, if I mention one or two of the problems which arose in the early design stage.

'The prototypes of the Romford plant were the relatively small capacity Onia Gegi reforming units at Point of Ayr and Verona, Italy. The Point of Ayr plant which some of you may have seen during the meeting is used for reforming mine gas, while the Verona plant reforms natural gas.

The first problem in designing the Romford plant was one of a very considerable scaling up in size, many times larger than the prototypes. One of the most important factors was the need for good distribution of the rich gas and steam over the wide area of the catalyst. The construction shown in the paper for the top of the reactor illustrates the method employing an inner refractory cone which was adopted for correcting the flow pattern and at the same time providing a convenient accommodation for the secondary burner.

'Natural gas and mine gas are predominantly methane, but the Romford

plant had also to be capable of reforming rich refinery gas of over 2,000 B.t.u. calorific value. At Point of Ayr and Verona, the plants were designed with single catalyst beds, as also was Romford initially. Subsequent work showed that higher efficiencies were obtained when reforming rich gas if the catalyst was arranged in two beds with means for preheating in-between. Romford initially had to deal with 700-2,000 B.t.u.

'The introduction of twin catalyst beds at Romford created problems of a different sort in that this development was not proved until after acceptance of the tender and commencement of design work. It is never easy to take a decision to incorporate a design change of this magnitude at such a late stage, but, in view of the importance of the installation, it was decided that this should be done and, as will be seen from the results, the change has proved to be well worth while, and as it turned out did not delay completion.

Special attention

'Details of the steam system are decribed in the paper. It was designed to be self-supporting both for prime movers and process. It was calculated that there was sufficient low grade waste heat remaining in the plant gases to justify recovery in air blast preheaters. These preheaters had to transfer heat to cold air from gases containing both steam and sulphur; and therefore special attention had to be given to the avoidance of corrosion at the cold end of the tubes. This was done by arranging the air flow within the preheater so that it was first co-current and subsequently counter-current in relation to the flow of the waste gases. An acceptable minimum tube temperature was thus obtained.

'The plant, like many other Onia-Gegi installations, has been erected in the open, rather on the lines of modern firing practice, and I think that is the correct thing to do. In this case, although there were four units, they were arranged in two pairs. The main reason for this was economy. I think that the arrangement that we have is the most economical.'

Dr. A. E. Haffner, Member of the Southern Gas Board: 'It is curious that by a twist of fortune which nobody could have suspected ten years ago, Romford has been magnified from a works to one of major size and potentially capable of being magnified still further into a giant works.

'It is also impressive that Mr. Stewart has matched up magnificently to these increased responsibilities, as shown by the work which has been done on that station and by the way he has presented the story of it.

'For a moment, I hope I may be permitted to refer to a similar plant of similar dimensions and which was referred to briefly by my colleagues in a paper to the Institution last year, when referring to experiences in handling refinery gas at Southampton. For two years, fuel bed reforming has been successfully and cheaply carried out at Southampton and it is only in recent months that the Onia-Gegi plants have been brought into use. They were designed primarily to operate on refinery gas which, although nominally purified at the refinery, still contained about 1% of H_2S. The plant was designed to be able to switch to liquid feed-stocks, and indeed has operated on fuel oil as well as refinery gas; they can also be operated on virgin naphtha.

'This versatility in accepting this range of feedstocks on both blow and make made it necessary to build a waste gas stack about 100 ft. higher than that at Romford because Romford is not designed to use feedstocks with an appreciable sulphur content even though that may be cheaper.

'Another feature of the Southampton plant is that there are two layers of nickel catalyst within the reactor with facilities for intermediate combustion during the blow phase and no air preheater on the Southampton plant. In this conception of the Southampton plant it was assumed that the nickel catalyst, which had proved itself to be robust in making gas from medium fuel oil up to 3% sulphur, would be able to cope with refinery gas of 1% hydrogen sulphide. This has proved not to be the case, and it is found that the output from the sets on this sulphur bearing refinery gas is no greater than when using fuel oil. The two processes are not strictly comparable because with heavy oil the finished gases are made in the plant itself; refinery gas, however, is reformed at the lowest possible calorific value and then cold enriched automatically with neat refinery gas. The combined output from the plants is greatly influenced by the lowness of the calorific value of the reformed gas. For instance, the final output from a plant reforming down to 250 B.t.u. is twice that of one reforming only to 400 B.t.u. This is with refinery gas at 1,000 B.t.u. If the refinery gas falls to lower calorific value than this, the total output increases remarkably, and if the refinery gas were at 500 B.t.u. the output of the plant would be infinite, and indeed no plant would be needed!

Purifiers

'There are other detailed differences and similarities in design and operation which are of considerable interest to those operating the plant, but the outstanding difference is in the effect of the hydrogen sulphide in the Southampton refinery gas.

'With sulphur in refinery gas it has been found that it is not easily possible to get down below 400 B.t.u. even after raising the temperature higher than those quoted by the authors. In effect, this alone causes a lower output, as has just been explained. More seriously, the activity of the catalyst is so diminished that space velocities have to be reduced. To some degree this problem was anticipated before the plant was built and it was expected that with complete sulphur removal the efficiency of the plant would rise through being able to operate at somewhat lower temperatures. The anticipated difference did not appear to justify the capital expenditure. Experience, however, has shown that the effect is much greater than was anticipated, and we are now installing simple high pressure iron oxide purifiers which will be completed by the time the greater outputs are needed. These purifiers will have facilities for rapid remote swinging operated from the control room. It is reassuring to learn from the paper of the greatly increased outputs which can be anticipated when refinery gas has been pre-purified to fine limits.

Romford output

'It is interesting to compare these outputs with those which have been obtained by U.G.I. plants with nickel catalyst using natural gas. Comparisons with other plants need to be made with great caution because of the different composition of the feedstock gas and because of differences in the proportion of inerts derived from purifying, but information collected during the 1955 I.G.U. tour in America revealed that from a 12 ft. o.d. U.G.I. reactor containing 5 ft. deep of 1-in. nickel catalyst spheres, 12 mill. cu.ft. per day of reformed gas could be made from natural gas. At that time none of the existing 16 U.G.I. plants had used refinery gas but based on natural gas experience, it had been calculated that from a 12 ft. o.d. reactor there could be produced 9.4 mill. cu.ft. per day of reformed gas, at 304 B.t.u., which could be enriched to a total of 11.3 mill. cu.ft. per day at 490 B.t.u. and 0.50 specific gravity. It is rather unreliable to translate that for the large diameter of Romford, but it looks as if there is still scope for increased output from the Romford plant. The authors have indeed stated that the range of output from 5.3 to 13 mill. could undoubtedly be widened in the future. Knowing the authors and remembering what they have done already with carburetted water gas plant, there is no doubt that the output will be increased, particularly since it appears that the second layer of catalyst has now relatively little work to do.

'I should like now to ask one or two questions. As a contribution towards thermal efficiency, the air pre-heater at the outlet of the waste heat boiler has done some good work. This too is only available with sulphur-free feedstock because with sulphur, the outlet temperature from the air preheater would be lower than the sulphur acid dew point. Could the authors please tell me the inlet and outlet temperatures and what is the pressure drop at the air preheater?

'From the Sankey diagram it would appear to contribute about 1.1% to the overall efficiency. It depends upon the price of refinery gas whether the capital expenditure on this air preheater and the additional power required for the blower is justified, and in the Southampton case it was decided not to do so, but space has been left for its incorporation, and that is why I am asking the question.

The authors state that there is thermal reforming taking place in the passage through the chequer bricks of the steam preheater and that the greater proportion of the total reforming is achieved in the first catalyst bed. Could the

authors state what is the calorific value of the gas before passing through the second catalyst bed and, on the basis of this experience, would the authors suggest that the plant could be even more simplified and reduced in capital and power expenditure? This may seem to be grasping greedily at advantages, because the authors have already shown that the capital charges have been decreased considerably by achieving more than the anticipated outputs.

'I should also like to ask whether the gas produced from this plant after mixing with other gases from the Romford works is sufficiently distinct and detectable by odour to render further odorisation unnecessary? This has been found to be the case at Southampton.

'Finally, although this paper demonstrates impressively the outstanding achievements in a low-pressure, cyclic catalytic process, do the authors believe that the next development would be in the direction of high pressure continuous processes, as indeed the petroleum and chemical industries have already shown us?'

Mr. G. Dougill, Planning Engineer, North Thames Gas Board: 'In the discussion on this excellent paper, I should like to take the opportunity of raising a point which to my mind is very important when considering the use of oil or refinery gases by our industry.

'When refining was mainly carried out in the Middle East, only those products required for sale and use here were shipped to this country. Now that the great proportion of the crude oil is rectified here, the oil companies are compelled to market all products simultaneously and sales must be in proportion to the various fractions distilled. This is no mean problem when the huge outputs of the primary petroleum stills are borne in mind. Some assistance is, of course, obtained by the provision of cat. crackers, reformers, etc., which can transform unwanted products into desirable ones, but at a cost, and in turn these usually produce some unwanted by-products.

Working arrangement

'When one visualises that should any liquid product accumulate beyond its storage capacity the distillation of crude oil must stop, the problem can be seen to be a serious one. If, therefore, a large consumer of oil products, such as the gas industry, can be less choosey in the quality of the products it is willing to take, there would appear to be the basis of a very good working arrangement with the oil companies which could be of benefit to both sides, resulting in, on the one hand, the availability of an alternative raw material for us, and on the other a bread-and-butter market for products which the oil companies wish to dispose of and which, if sold, enable them to produce more of the easier selling products at the higher prices.

'Another factor that must be taken into account is that sudden political changes in world affairs may compel refineries to use crude oils from other areas. As is well known, this may result in the production of very different proportions of gases, petrols, light oils and heavy oil products.

'It seems, therefore, that what we must be prepared to face is not a general shortage of oil products but relatively sudden changes in the availability of the various products. This is catered for in the Romford plant, since it is capable of reforming products varying from natural gas, refinery gases and l.p. gases, to primary flash distillate. Even wide scope is possible in products used for the heating phase. I do feel that this is a most important aspect of the design of all plants gasifying oil products, and one which is extremely well demonstrated in the plant under discussion.

'Apparently we must be prepared to take:—(a) Most of the refinery gases of varying composition according to the processes most in operation. (b) A large quantity of l.p. gases such as cannot be utilised otherwise. (c) Primary flash distillates when it is available. (d) Gas oil when available or heavy oils in varying proportions when it is less available.

Oil outlet

'As shown in the paper, this works does just this. Primarily it is to deal with refinery gases; temporary failure of supply is covered by stored p.f.d. Heating can be by alternatives, and there is, of course, the catalytic oil plant and the carburetted water gas plant, and in the background there is, of course, the liquified natural gas.

'This plant should, therefore, not only be of great value to us as a gas-making unit, but should also provide an outlet to the oil companies for products which would otherwise have limited markets.'

Dr. J. Burns, in reply, said: 'We are always grateful to contributors to the discussion on a paper such as this, because it gives us the chance of seeing our jobs and work and achievements as others see them, and it is always helpful if we can take advantage of the lessons learned from such a discussion for the general good of the job as a whole.

'On Mr. Hutchison's important points, it is true that the Romford plant is tailor-made for a specific purpose, and when the plant was conceived it was tailor-made for this specific raw material. When the plant was conceived, obviously we had to ask ourselves the question, is this raw material available, or is it not, and for how long is the raw material available, and if it is available for no longer than a certain time, can we afford to write off the plant during the time that it is available? There were two possible sources of supply. Shell offered raw material in the form of refinery gas for a long period of time, and there came a further source of that form of material from the Mobil Oil Co., Ltd. In that case there were two sources of raw material which allowed us to feel that the plant could be written off over the period of time for which Shell offered us our raw material. We had the choice of two Shell advertisements at that time. One said "You can be sure of Shell"; the other said, "That's Shell—That was!" We had sufficient faith in Shell to accept the former and we went ahead.

'But even three or four years ago we asked ourselves if there was anything at all in this methane business. We felt there was every possibility of this business coming off and that we could take a certain amount of risk by a connecting up of Shell Haven to Romford. Romford would be able to use the methane which we hoped would one day come along. There is no limit at all to the length of time over which we are likely to get methane if it comes at all.

Siting of Plant

'On the siting of these plants, there are no fixed and absolute rules that you should follow and set out as being unalterable. In the siting of new plant of that type, you have got to look at the conditions of raw material supply and the supply of material from the plant, but there are one or two simble basic rules which I think should be followed.

'If you have got to transport your raw material at all, then you must transport it in the most concentrated form. And if you have got to carry sulphur, then do not do so! That is one rule that you should clearly follow at all times. Remove the sulphur as near to the source of the raw material as you can, because sulphur is a dreadful material when you have got it and it is a dreadful material when you have to carry it.

'We are very grateful indeed for the points that Mr. Davies made. I would say that the collaboration which we had from all the contractors associated with the job was very fine indeed.

'To the points that Dr. Haffner raised we will reply in writing. He posed the general question, should the gas industry follow the example of the chemical and oil industries and go over to high pressure operation, and the answer is—certainly we have to, provided that it pays!

Japanese licensees of Power-Gas get c.w.g. plant order

THE Mitsubishi Chemical Machinery Manufacturing Co. Ltd., of Tokyo, Japanese licensees of the Power-Gas Corporation Ltd., has received an order for one unit of carburetted water gas plant, with a capacity of 2 mill. cu. ft. per day, for the Saibu Gas Company. Four units, each of similar capacity, have previously been installed for the same company. The licensees in Japan have also received contracts for four gas producer units, each 10 ft. 6 in. diameter, and for a CO conversion plant for Toho Gas Company.

Since 1954, the company's licensees in Japan have received orders for c.w.g. units with a total daily productive capacity of 118 mill. cu. ft.

Ultra-sonic Dust Precipitation

—from an article by E. Zedet, Génie Chimique Supplement of Chimie et Industrie, February 1959.

THE term 'ultra-sonic' evokes the idea of vibrations of frequencies above the limits of audibility. But audibility is intimately connected with the qualities of the organs of hearing at the disposal of living beings. It characterises in no way the phenomemon of sound, which is of the same nature whatever the frequency of the vibrations which constitute it—this is essentially characterised by the fact that it is transmitted upon a material support contrary to some other known vibratory phenomena such as light and electro-magnetic waves.

Audibility, then, being variable according to the individual and the living species, it is preferable to free ourselves from a reference so unprecise.

A given periodic movement is characterised by the formula

$$a = a_0 \sin 2\pi\left(\frac{t}{T} - \frac{x}{\lambda}\right) \quad \text{..... 1}$$

where a_0 is the amplitude of the movement, *i.e.*, the maximum elongation,

t is the instant under consideration.

T is the period, the inverse of the frequency, *i.e.*, of the number of the vibrations per second,

x is the abscissa of the peak from the axis of propagation which is considered at the instant t.

λ is the length of the wave assuming its initial and terminal points are in the same physical conditions.

In general the oscillation of the molecules follows the axis of propagation of the vibratory movements—they are longitudinal vibrations. It is known, too, that a vibration in a material medium is propagated at a speed which varies with the medium and which is independent of the frequency. Hence the second equation:

$$\lambda = cT = \frac{c}{N} \quad \text{..... 2}$$

where N is the frequency and c is the speed of propagation which takes different values according to the medium.

The movement represented by the equation (1) has a certain speed, u, also a sine-function of time, as well as an acceleration, f. It causes a certain compression, P, giving rise to a certain quantity of work which will be transmitted in the medium under the form of a 'density of energy'(the energy contained in unit volume of the medium). If the vibration is propagated by waves across unit surface, a definite quantity of energy will cross this unit of surface in unit time—this will be called the acoustic intensity or power. The 'density of energy,' W, is equal to the acoustic power divided by the speed (of propagation).

$$W = \frac{I}{c} \quad \text{..... 3}$$

For a given medium all these physical magnitudes depend only on two independent parameters, the amplitude of the movement and its frequency, or on two magnitudes which are functions of these and chosen as independent variables.

The presence of this acoustic intensity at a given point of the medium can be utilised to overcome the inertia of the particles suspended in the medium.

The Principle of Ultra-sonic Dedusting. The general principle of ultra-sonic dedusting consists in causing a coalescence, an agglomeration of particles, so as to render possible other means of elimination which are only effective with relatively large particles.

1. Stationary waves. The method to be described pre-supposes the creation in the medium of 'stationary waves.' It is known that all vibratory movement

$$a_1 = a_0 \sin \frac{2\pi}{T}\left(t - \frac{x}{c}\right)$$

making a screen, placed at distance, D, is reflected. At a point situated at the distance x from the origin the movement reflected will be

$$a_2 = a_0 \sin \frac{2\pi}{T}\left(t - \frac{2D - x}{c}\right)$$

The resulting movement will be

$$A = 2a_0 \sin \frac{2\pi}{T}\left(t - \frac{D}{c}\right) \cos \frac{2\pi}{T}\left(\frac{D - x}{c}\right) \quad \text{..... 4}$$

The expression A will be nil when

$$x = D \frac{\lambda}{4}(1 - 2k) \quad \text{..... 5}$$

Radial Movement

Calculating the values of the different physical parameters of the vibratory movement it is easy to see that where the movement is nil the pressure is at the maximum. On the other hand, the pressure of radiation, $\triangle$ W, *i.e.*, the difference of the density of energy on the one and the other side of a plane is directed from the loop of the movement (curve) towards the nodes. It is nil at the nodes and at the tops of the curve and a maximum at the middle. The interval between a node and the top of the loop appears as a zone separate from the rest of the tube. The sense of circulation there is inverse on the axis of the tube and at its surface. Thus two axial currents of inverse sense meet at the nodes of movement to become radial and to carry the particles towards the surface of the tube.

2. Effects of co-vibration. In this first phase the particles—it follows from the two effects mentioned above—conform to the vibratory movement of the medium and meet at the nodes of the movement. Two equations, Nos. 21 and 22, in the original paper but not reproduced in this translation, show that the two values, in each particle, its density and its diameter, tend to induce divergent and even opposing movements and therefore collision. But it is necessary that the amplitude (of movement) of the several particles should be of the same order of magnitude as their respective distances—the frequency of vibration must not be so great as the point at which they are immobilised by their inertia. The

ultra-sonic frequency must be limited. Further the differences of dimensions of particles involve the necessity that their velocity must be relatively greater when their diameters are small. The effect of collision will be the greater as the particles are smaller.

Analysis shows that the differences of amplitude between the movements of the particles, upon which efficacy depends, are a function of their acceleration and that efficacy is at the maximum when the ultra-sonic intensity is $\frac{1}{2}fa_0rc$ where r is the specific mass of the medium.

3. The hydro-dynamic effect. When the particles are localised at the nodes of the movement their proximity facilitates the play of molecular attraction and the particles increase in size—they no longer participate in the original vibration but describe irregular trajectories and agglomerate more and more. From the law of Bernouilli it follows that F (the resistance of the medium to the movement of the particles) is inversely proportional to the fourth power of *a* (the amplitude of the vibration). The ultra-sonic efficacy will be thus much greater as the concentration of dust is the greater. If the concentration is low it is therefore logical to inject non-resistant aerosols of water or oil. On the other hand F increases with the frequency.

Compromise Necessary

It is further shown that absorption depends very much on the frequency N and the speed of propagation c, both dependent on the viscosity of the medium. Thus for a frequency equal to 10^5 hertz the acoustic intensity falls to one half at 4,000m from the source in water and at 22m in air. At the frequency 10^6 hertz a similar drop occurs at .22m from the source in air. It is therefore necessary to compromise between the desire to increase the relative velocity of the particles and the gaseous medium, and the necessity, if it is desired to create effective stationary waves all along a tube of coalescence, to have frequencies which in practice lie between 3,000 and 10,000 vibrations per second, *i.e.*, frequencies which are audible by man. However, tests by M. Boucher in a vessel with fog have given good results with frequencies of 33,000 H_z. Obviously, the use of audible frequencies would entail the use of apparatus in a sound-proof casing.

4. Effect of the sides of the tube. A final phase is that where the particles moved by the different turbulent forces come into contact with the sides of the tube, whence they can be eliminated by a stream of a suitable wetting liquid.

An ultra-sonic dust precipitator consists essentially of (a) an emitter of low frequency, (b) a cylindrical tube of such length, according to the velocity of the gas, as that the 'sonorisation' shall last at least 2 seconds, (c) an adjustable reflector at the extremity of the tube to give rise to stationary waves, (d) pulverisers arranged along the tube to increase the number of particles, and (e) a cyclone to receive the enlarged particles which are not removed by the wetting liquid on the walls (say 50%).

As the sonic generators are generally worked with compressed air the disturbing effect of this air on the tube is avoided by arranging the generator at right angles to the tube. A screen inclined at 45° and pierced with holes will permit the air to collect in the cyclone and the ultra-sons to be reflected into the tube. The arrangement is shown diagrammatically in Fig. 1.

The necessity to obtain stationary waves directs the choice of generators to those which will produce waves in one plane (ondes planes). An ultra-sonic 'whistle' takes the form of a cone of which the angle at the centre α is such that

$$\text{Sin } \alpha = 1.22 \, \lambda/D \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 6$$

D being the diameter of the generator. The smaller the angle the greater will be D. But the greater the angle α, the greater the section of the cone at a distance x and the smaller the density of energy per unit of section. A generator of large diameter is therefore necessary.

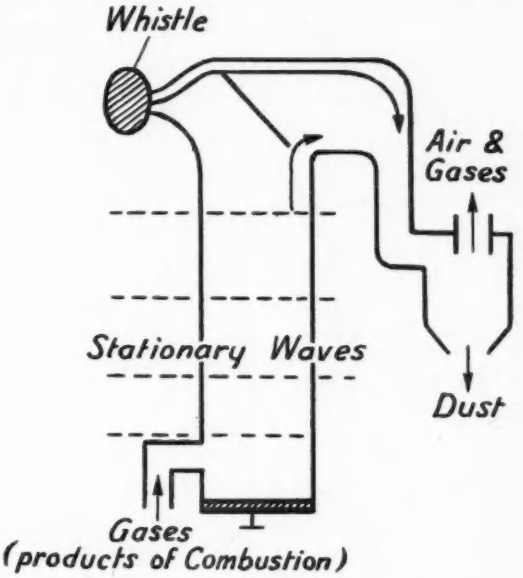

Fig. 1.

In spite of the interest in the Hartmann siren to obtain 'ondes planes' the necessity to have a density of energy at least equal to 1 W/cm² at the interior of the tube leads to the adoption of apparatus of the whistle type. A static whistle made by C.R.S.I.M. of Marseilles has been used in our tests. It has a longer life than the rotary whistle but the disadvantage of a fixed frequency, nearly harmonic. But the work of M. Boucher has shown clearly that there exists an optimum frequency in relation to the size of the particles which indicates that apparatus of variable frequency would be preferable.

Absorption Prohibitive

Since in practice, however, industrial dusts have very variable size grading, one could not evidently use a generator consisting of a range of whistles emitting simultaneously different frequencies. This is because one cannot know which is the best frequency for an unknown particle size, and on the other hand the energy absorbed would be prohibitive if it was distributed over a number of whistles each with a sonic density exceeding, at each point in the tube, a minimum of 1 W/cm².

The characteristics of the apparatus used in the experiments made on the industrial scale were the following; a frequency of 2,500 hertz (vibrations per

second), a compressed air pressure of 3 kg. per sq. cm (say 3 atmospheres) and an output of .05 cu. m. per second. During 72 consecutive hours working, dedusting over 90% was obtained with tarry products of combustion. But the capacity of the precipitation tube did not exceed 500 cu. m. per hour for an air consumption of 180 cu. m. per hour. Such a result could not be industrially satisfactory.

A new generator of the same model was developed but with the following characteristics; an air pressure: 2 kg. per sq. cm. to. 3 kg. per sq. cm.—say 3 to 4½ lb. per sq. in. —an output of .25 cu. m. per second, acoustic density of 1,000 W per sq. cm. and a frequency of 2,500 H_z. This apparatus, which will be tried soon, should be adaptable to a tube with a hoped for capacity of 8,000 cu. m. per hour.

Instead of being fed with compressed air at 3 kg. per sq. cm. this will be reduced to 200 g. per sq. cm. with a correspondingly reduced consumption in kilowatt hours. To treat 100,000 cu. m.—say 3½ mill. cu. ft.—of combustion products per hour would require 12 vertical tubes .6 m.—23.6 in.—diameter by 15 m.—about 50 ft.—high corresponding to about half the price of an electrostatic apparatus.

It is no doubt too soon to guarantee the effectiveness of ultra-sonic dust precipitation or its industrial economy. Results realised with tars do not permit an extrapolation of results obtained with other dusts of other chemical compositions. The first whistle experimented with consumed 180 cu. m. of air at 3 kg. per sq. cm. to treat 500 cu. m. of products of combustion per hour with an efficiency of 93.4% but a sonic efficiency of 3 to 5%, with a power consumption of .05 kWh per cu. m. To treat 100,000 cu. m. would require, with the test generator, 200 units each of 180 cu. m. per hour compressed air corresponding to a power consumption of 1,800 kWh with cost of the order of 129,000 francs. The substitution of the new generator should reduce the cost of power to around 5,000 francs. The total cost of treatment including capital charges, should be definitely lower than with electrostatic apparatus. It is not however advisable to visualise a competition between the two techniques—they should work together.

We have seen that the sonorisation of dusts, especially if their density is low, was facilitated by the addition of pulverisers with an hourly consumption much lower—say 1/15—than with systems of dedusting by aerosols. We have also seen that the aerosol and electrostatic systems have ranges of low efficacy according to the dimensions of the particle. The use of ultra-sonics would deal with these difficult ranges and the installation of an electrostatic apparatus in line after the ultra-sonic would no doubt greatly increase the efficiency of the electrostatic apparatus itself.

Without disparaging the advantages gained from ultra-sonic precipitation employed alone, when it is a question of fine and abundant particles, it is permissible to think that the association of this technique with those which experience has already confirmed should contribute to the solution of problems of dedusting which today are only incompletely solved. It is hoped that, in the near future, experiments now in hand will yield results worthy of interest.

Creep Information Centre

AFTER requests from manufacturers and users of high-temperature materials, a Creep Information Centre is being set up at the National Engineering Laboratory (formerly the Mechanical Engineering Research Laboratory) at East Kilbride, so that industrial designers can more readily obtain data on the strength of high-temperature materials. It is hoped that it will become the national centre for information on the strength of high-temperature materials. All interested organisations are invited to co-operate in supplying experimental data so that the scheme may become as effective as possible.

The main object of the Centre will be to collect and tabulate all the available data on creep and rupture properties of conventional high-temperature materials. Data for British materials will be issued in an agreed form as far as considerations of commercial security allow. The scheme will later be extended to include fatigue and other mechanical properties of high-temperature materials and information about test procedures and testing machines; data on foreign materials may also be included.

A leaflet giving further details of the scope of the Creep Information Centre is available from the Laboratory. All firms and research organisations concerned with the production or use of high-temperature engineering materials are invited to participate, and to write to the Director, National Engineering Laboratory, East Kilbride, Glasgow.

British Council course in ergonomics

ERGONOMICS—the study of the relationship between man, the machine with which he works and the environment in which they are situated—is the subject of a 14-day British Council course in October for overseas specialists in industry, personnel management and medicine.

The aim of ergonomics is to perfect the functional unit of industry—man and his machine—so as to promote accuracy and speed of operation with minimum effort and maximum efficiency.

The course, titled 'Introduction to Ergonomics: An Approach to the Problem of Human Work,' is the first of its kind to be offered by the British Council. It is designed to provide a survey of research developments in ergonomics and of their application to work design and organisation.

It will include talks by speakers who are engaged in applying ergonomics in industry and visits will be made to laboratories where research is in progress. The Director of Studies will be Mr. K. F. H. Murrell, of the Department of Psychology, Bristol University, and the course will be centred on Medical Research Council laboratories in Oxford, Cambridge and London.